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THE BACTERIAL FLORA OF WAR WOUNDS:

INFLUENCE OF TREATMENT.

BY

SIR KENNETH GOADBY, K.B.E., M.R.C.S.,
L.R.C.P., D.P.H.CANTAB.,

HONORARY BACTERIOLOGICAL SPECIALIST, ROYAL HERBERT HOSPITAL, WOOLWICH; MEMBER OF THE WAR OFFICE COMMITTEE FOR THE STUDY OF TETANUS.

(Report to Medical Research Committee.)

THE wounds of war differ from the majority of wounds in civil life in that they contain a very large number of bacteria, resulting in prolonged suppuration, slow healing, and deforming cicatrization. In no industrial wounds, except a limited number occurring in agriculturists, does soil contamination play such an important part as in the wounds of war, and as the bacteria of the soil figure largely in the flora of war wounds, a comparative study of the bacterial flora of the wounds extending over long periods may throw some light on the benefit of one or other method of wound treatment, and suggest a direction in which effort should be concentrated.

From the commencement of the war I have made routine bacteriological examinations of the convoy cases arriving in certain home hospitals; these examinations have been conducted in a uniform manner throughout. The routine adopted has been (*a*) the examination of film preparations

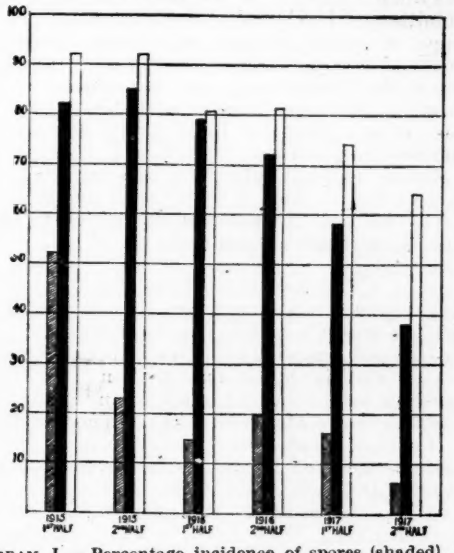

DIAGRAM I.—Percentage incidence of spores (shaded), bacilli (black), and cocci (white), in Gram-stained films. Periods of six months, 1915–17.

of the discharge material stained by the Gram method, (*b*) the cultivation of the discharge material on (1) glucose broth, (2) sterilized milk, (3) minced autoclaved meat. The cultures were examined in the ordinary routine manner and where necessary plated out, or the cultures carried far enough to determine the various groups in which the organisms are scheduled. A considerable amount of effort was expended to commence with in perfecting anaërobic apparatus, and the results and methods have been published elsewhere. Certain general conclusions regarding the bacteriological flora of wounds have been reached. In the early part of the war, especially in the winter of 1914–15, many wounds arriving in home hospitals were extremely septic, sloughing, and emitted an offensive putrid odour. At intervals during the succeeding years a slight return to this condition has occurred from time to time, during periods of stress, but the general physiological character of the wounds has undergone a steady and progressive improvement. In the early period the number of spore-bearing organisms found in films made from the wound discharges was large. Three types of sporing organisms were observed: (1) Bacilli with a central spore, staining deeply by Gram's method; (2) bacilli containing a sub-terminal spore; (3) bacilli with a rounded or oval end-spore. In the more putrid wounds all three classes were represented, but mainly the third, whereas in the cases of acute localized oedema with bubbles of gas in the discharge and, in a few cases, acute gas gangrene spreading from the wound, the main class of organism present was the central spored bacillus. During 1916 and the first half of 1917 these organisms were less often met with; during the last half of 1917 a limited number only were observed.

Diagram I shows the relative percentage incidence of the various classes of organism met with in the pus films. The cases are collected into periods of six months, commencing with 1915, and the number of cases with spore-bearing organisms shows an extraordinary and progressive diminution, except for a slight rise during the second half of 1916. These relative proportional diagrams do not convey the intensity of the infection in any given wound, but merely the percentage of cases in which spore-forming bacteria were found in the pus films. The other two columns represent—the white column cocci, both streptococci and staphylococci, and the black column bacilli, both Gram-positive and Gram-negative. During the first two years Gram-negative bacilli belonging to the *coli* and *proteus* groups were frequently met with, but the incidence of these organisms, especially the *proteus* group, has diminished during the last nine months. The cases from which these examinations are made were all examined within twenty days of wounding. About 33 per cent. were examined within the first week; this proportion has been maintained throughout, so that the groups of cases remain fairly comparable. The results of treatment appear, therefore, to have progressively diminished wound infection, but it by no means follows that the absence of bacteria in the films of the discharge is indicative of the freedom of such wounds from bacterial infection.

Diagram II shows how far this divergence exists; in this diagram the proportional incidence of bacteria in the

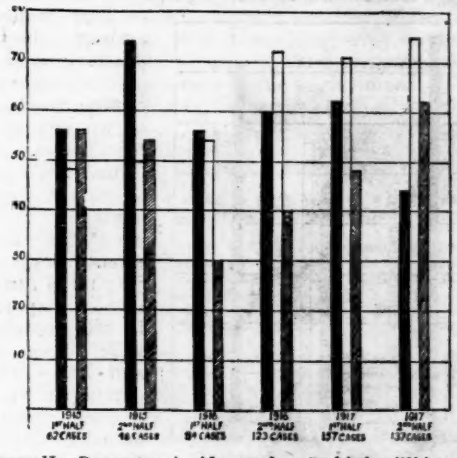

DIAGRAM II.—Percentage incidence of anaërobic bacilli in wounds 1 to 20 days old. First examination on admission in home hospitals. *Black* = Saccharolytic group, type *B. perfringens* (*welchii*) (cultivation). *White* = Proteolytic group, type *B. sporogenes* (cultivation). *Shaded* = End-spore group, type *B. tetani* (cultivation).

wounds obtained by cultural methods is given in percentage proportions. The columns relate to three types of anaërobic bacteria: the black, the saccharolytic group, of which *B. perfringens* or *B. welchii* may be taken as the type. The white column, bacilli of the proteolytic group, of which *B. sporogenes* or the bacillus of malignant oedema may be taken as the type; whilst the shaded column indicates the number of organisms forming end spores of the tetanus and other allied groups. It must not be supposed that this class represents tetanus bacilli; it merely indicates the large class of end-sporing bacilli to which the tetanus bacillus belongs.

During the first half of 1916 there was an apparent diminution in the number of sporing anaërobes isolated from the wounds, but from this period forward to the end of 1917 the incidence again rises steeply. From 1915 to June, 1916, the number of proteolytic and saccharolytic organisms remains about the same. A considerable rise occurs in the second half of 1916, and the wounds from this period remain at a higher level of infection, the only diminution being a decrease in the number of proteolytic organisms in the second half of 1917. It is freely admitted that the number of cases examined is extremely small in relation to the total number of wounded. On the other hand, the series has been entirely performed by one observer and according to a constant routine. A possible

explanation of the smaller number of infected wounds culturally up to June, 1916, may perhaps bear some relation to the larger number of bullet wounds, and there is a possibility that from 1916 onwards shell wounds have figured more largely, causing a deeper infection of the tissues.

A comparison of Diagrams I and II points very strongly to the inadequacy of simple film examination in determining the bacterial content of any given wound. It must be pointed out in relation to Diagram II, as to Diagram I, that the percentage occurrence of the groups indicated in the table is no criterion of the mass extent of the infection, as the cultivations were always re-examined at intervals for fourteen days to allow of the growth of any organisms that were present. The diminution in the flora of the wounds, as estimated by film preparations given in Diagram I, together with the apparent increase in the numbers of cultivable bacteria given in Diagram II, suggested some influence which, at any rate, was diminishing the mass infection of the wound. Unfortunately, it is only since June, 1917, that the medical field cards have been available; before this date no information was forthcoming as to the earlier treatment of the wound except by hearsay. From June, 1916, the field cards give a record of the number of wound excisions performed in the casualty clearing stations, as a rule within twelve hours of wounding; it was thought, therefore, that a comparison of the percentage flora in excised wounds and non-excised wounds might give some information as to the possible cause of the diminution.

In Diagram III I have therefore collected the percentage incidence of anaërobic flora from 100 excised wounds examined from June to December, 1917, and of 100 non-excised wounds examined between January and June, and a further graph of the total number of wounds examined from June, 1915, to June, 1917. There is thus a total percentage of all wounds examined within twenty days of injury up to June, 1917, and the percentage in 100 wounds which have been excised and 100 wounds occurring in the immediately preceding six months, of which no notes are available as to the original operation, if any. The columns in Diagram III are: First, spore-bearing organisms in films from wound discharge; black, the saccharolytic group, determined by cultivation; white, proteolytic group, determined by cultivation; dotted, end-sporing bacilli. It will be seen at once that in the 100 excised wounds all four classes are greatly diminished. Not only have the spore-bearing organisms in direct films diminished, but the spore-bearing bacilli obtained by cultivation also show a considerable diminution, whilst both proteolytic and saccharolytic groups are diminished, the proteolytic to the greatest extent. It may therefore be fairly inferred that the immediate excision of wounds performed at the casualty clearing stations has a very great influence in diminishing the number of bacteria cultivable from the wounds five to twenty days afterwards.

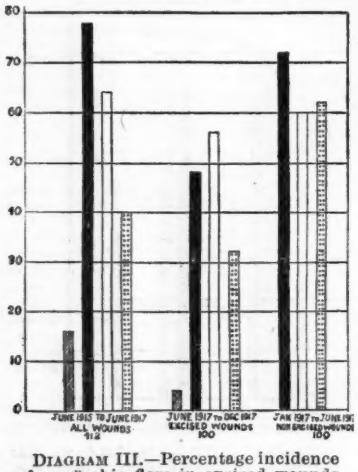

DIAGRAM III.—Percentage incidence of anaërobic flora in excised wounds compared with non-excised wounds. *Shaded* = Percentage of wounds with sporing bacilli in the pus films (films from pus). *Black* = Percentage of wounds with saccharolytic group (cultivation). *White* = Percentage of wounds with proteolytic group (cultivation). *Dotted* = Percentage of wounds with end-sporing bacilli (cultivation).

Influence of Antiseptics on the Bacterial Flora of Excised Wounds.

The possible influence of the antiseptic used on the diminution of bacterial flora naturally arises in connexion with these wounds. The 100 excised wounds were therefore examined carefully to determine if any influence could be traced to the antiseptic used. Fifty of the wounds had been treated with hypochlorite, with or without Carrel tubes; forty had been treated by bipp. The remaining ten had various forms of antiseptics, including flavine and brilliant green. The two chief antiseptics in use were hypochlorite and bipp. On examining the percentage of the flora in each case there was no difference whatever attributable to either antiseptic. In each class—hypochlorite and bipp—the incidence of sporing bacteria and *Bacillus welchii* was 30 per cent.; for the proteolytic type 29 and 31 per cent. respectively. If either of these two antiseptics had any specific action in reducing one or other variety of bacterial infection, one would have expected it to show in a series of wounds treated in the same manner. So far, no sufficient number of cases treated with *no* antiseptic from the moment of excision is available.

Certain practical disadvantages are associated with both these antiseptics.

1. Hypochlorite: Cases treated with Carrel tubes rarely arrive in home hospitals with the tubes in the position in which they were originally placed, and on the rare occasions on which they are still in the wound the tubes are generally so blocked as to render them entirely useless. On the other hand, as the Carrel tubes are passed through the bandages and fresh hypochlorite is passed down the tube, some of it finding its way into the wound or into the dressing, the chief advantage appears to be that the bandages are not removed in the ambulance train and the case submitted to the chance of fresh infection.

2. Bipp: A certain number of wounds arrive with so much bismuth inserted that it partially obscures the finer structure in fractured bones. A certain number of cases—10 per cent. of 100 cases treated with bipp—have shown symptoms of poisoning due to bismuth—blue line of the gums, blue tongue, and blue patches on the buccal surface of the cheeks, gastritis, diarrhoea and vomiting. Three instances have been seen of iodine poisoning with mental symptoms. In cases of poisoning attributable to the bipp very large quantities had been made use of.

Latent Infection.

This has proved a very common sequela, and has been observed principally in certain classes of wounds.

1. *Flesh wounds*, especially penetrating, lacerated wounds. In these wounds histological examination of the tissue in the immediate neighbourhood of the wound shows changes similar to those associated with gas gangrene, and described in my previous papers,[1] and also the type of muscle degeneration described by McNee in acute gas gangrene. Reference to Diagram III demonstrates that organisms belonging to the saccharolytic gas-forming group are extremely common. There is overwhelming evidence that a large proportion of wounds suffer from incipient gas gangrene, but that the process is arrested by the action of the tissues. I have already published photographs of tissues showing active phagocytosis in incipient gas gangrene.[2]

2. *Bone Injuries.*—Latent infection, as distinct from persistent local sepsis, is more common in bone injuries than in flesh wounds. Comminuted fragments have rarely been found united, even after long intervals, and comprise by far the greater number of sequestra removed at subsequent operations. The sequestra removed from such cases—six, nine, twelve, and eighteen months after the original injury—often show the sharp edge of the original fracture. Radiographical examination and histological examination, together with bacteriological observations, show two main forms of sequestra—(*a*) hard, (*b*) soft. The softening sequestra appear to be bacteriologically related to *B. welchii* and the streptococcal groups, the hard sequestra more often to the proteolytic groups, *B. sporogenes*. General local loss of opacity to the *x* rays is associated with loss of lime salt in the bone, and is apparently associated with the saccharolytic group, though no definite acid reaction occurs in the tissues owing to the action of the buffer substances. Histological examination in latent infection, persistent infection, and closed cavities containing metal fragments or fragments of bone, show scattered organisms in small clusters enclosed in a wall of fibrous tissue. The tissue in the immediate neighbourhood of such bacterial nests is often normal in structure. In ankylosed joints which have been excised after complete healing of the external wounds bacteria have invariably

been found sequestered in the partially destroyed cartilages. Infected areas are met with here in close proximity to normal tissue, and more organisms have been found at the extreme limits of the affected and damaged areas than in the centre of fibrous degenerated tissue. One of the difficulties attendant on subsequent operations on joints, especially excision, is the secondary suppurations which undoubtedly arise from these loculi containing remnants of the original infection.

Wounds Entirely Healed but Breaking Down after a Long or Short Interval.

Many wounds have been examined belonging to this class; they are frequently wounds involving bone, often with *very* slight bone involvement and no fracture. Histological and bacteriological examination give the same findings, whilst the penetration of the bacteria into the bone extends a considerable distance either side of the original lesion. These wounds break down again after trivial injury or over-exercise. A histological examination of tissue excised near such wounds shows the infection mainly at the junction of the normal and fibrous tissue. The outcome of bacteriological observations on a large series of wounds of latent infection, together with histological examination of excised tissue, points to the physiological action of anaërobic bacteria rather than to general systemic toxaemia as the underlying cause of the persistent infection. The most persistent organism is the *B. sporogenes*, which is in itself of low pathogenic power. It can, however, survive for a long time and in culture tubes, when associated with streptococci or organisms of the *coli* group, and undergoes cyclic development, spores forming and germinating slowly but persistently, with the result that the material becomes ultimately entirely digested. In cases heavily infected with the *B. sporogenes* persistent local oedema has been observed. Histologically, minute general thrombosis of vessels in the immediate vicinity of the wound is common; the thrombus may even spread up through the smaller vessels and project into the larger. Histological examinations of these cases show that the "splash" effect produced in the soft tissues by the velocity of the projectile extends over a considerable distance, that numerous radiating cracks in the tissue occur which become the seat of haemorrhage. The blood clot formed contracts, associated with the discharge of serum from the wound, coincidentally the bacteria make their way into the cracks, doubtless by capillarity, and subsequently become shut off from the main wound cavity by fibrous tissue and remain latent. There is some indication that this fact has an important bearing on the practical question of the movement of wounded men. It certainly has a very practical bearing on the deep infection of the wounds.

Summary.

In summarizing my observations on wounds in home hospitals from 1915 to the present time it appears—

1. That the mass infection has diminished progressively, but that

2. The persistence of anaërobic bacteria has not undergone similar qualitative reduction.

3. That by the use of the two antiseptics of which statistics have been available (bipp and hypochlorite) no great diminution in anaërobic flora has been effected.

4. That *latent infection* as opposed to *persistent infection* is of great importance in "subsequent operations," and that latent infection is determined by the treatment of the case in the first week of the injury, possibly in the first three days.

5. That in latent infection organisms are found in close proximity to healthy tissue and therefore in a region likely to become the site of an incision in a subsequent operation.

6. That bone fragments split off at the original injury invariably become sequestra, probably due to the proteolytic action of the bacteria rather than to destruction of blood supply.

7. That of the various methods which have so far been made use of in the immediate treatment of wounds, immediate excision of the lacerated tissues is apparently the only one that has produced a marked diminution in the anaërobic flora of the wounds.

REFERENCES.

[1] *Lancet*, July, September, December, 1916. [2] Ibid., September, 1916.

NOTES ON VIBRION SEPTIQUE.

BY

MURIEL ROBERTSON, M.A.,

LISTER INSTITUTE.

THE following is a brief account of the anaërobic organism known variously as the *Vibrion septique* and the bacillus of Gohn and Sachs; the name *B. oedematis maligni* has also been used for it.

The conflicting accounts of early writers and the very real difficulty due to the close symbiotic association of widely differing species of anaërobes has obscured our knowledge of this type. *Vibrion septique* is very easily passed over in mixed culture, so that its presence has often escaped the notice of workers dealing with wound infections. I propose to use the name *Vibrion septique*, under which I include the bacillus of Gohn and Sachs; *B. chauvei* is an allied type, but is a different organism.

The name *Vibrion septique* is here applied to a group of strains which are in complete agreement with each other in (*a*) morphology; (*b*) cultural characters, including the reactions upon various sugar media; (*c*) pathogenicity and reaction in the animal body. They do not, however, fall into one group upon the agglutination reaction.

From the trend of modern research it is becoming clear that in many cases the organisms responsible for any given pathological condition must be looked upon as a series of very closely allied types, which can in certain instances be separated from each other by various slight *differentia* and notably by the agglutination reaction. It may eventually be useful to subdivide the group into subgroups, possibly with specific names. It is proposed to deal with the agglutination reactions of *Vibrion septique* in another publication. In general, it may be said that in working with anaërobes it is premature to conclude that a strain represents a separate species because it produces specific agglutinins.

The following is a list of the strains studied:

1. *Vibrion septique*, Pasteur Institute strain.
2. B. R., Pasteur Institute strain.
3. *V. septique*, strain "Amatzi"; derived from blood culture; from Dr. Weinberg.
4. *V. septique*, strain "Cairny"; from fatal case of gas gangrene.
5. *V. septique*, strain "Summers"; blood culture from case of gas gangrene.
6. *V. septique*, strain "Dynes"; from fatal case of gas gangrene.
7. *V. septique*, strain "Prior"; from case of gas gangrene.
8. *V. septique*, strain "Alexander"; from haemorrhagic blister fluid in a case of gas gangrene.
   (Strains 4 to 8 were supplied by Captain Stokes.)
9. *V. septique*, strain "J. I."; from case of gas gangrene isolated by Miss Hempl.
10. *V. septique*, strain "James"; from case of gas gangrene.
11. *V. septique*, strain "Brissons"; from case of gas gangrene.
12. *V. septique*, strain 141; from case of gas gangrene.
13. *V. septique*, strain 133; from case of gas gangrene.
    (Strains 10 to 13 were supplied by Captain Henry.)
14. *V. septique*, strain 227; from wound of patient forty-nine days after wounding; no symptoms of gas gangrene.
15. *V. septique*, strain 145; from wound of patient seven days after wounding; no symptoms of gas gangrene.
16. *V. septique*, strain "Jerral"; from wound of patient without symptoms.
17. *V. septique*, strain "Bedford"; amoebic abscess of brain; material from Captain Armitage.
18. *V. septique*, "Milk" strain, isolated from milk.
19. *V. septique*, "Milk Con." strain, isolated from milk.
20. *V. septique*, strain "George A."; from case of gas gangrene developing upon operative treatment of a healed wound.
21. N. I., *V. septique*; strain isolated by Miss Hempl from wound of patient without symptoms of gas gangrene.

The following were studied for comparison:

22. *B. chauvei*; from case of black quarter; from Sir John McFadyean.
23. *B. chauvei*, culture isolated by Dr. MacIntosh from Rauschbrand muscle from Denmark.
24. *B. oedematiens*, strain "Jolly"; from Dr. Weinberg, from case of Dr. Dalyell.
25. *B. oedematiens*, strain "Delombre"; from Dr. Weinberg.

I have much pleasure in expressing my cordial thanks to the many colleagues to whom I am indebted for material from cases in their charge, or who have most generously placed their cultures at my disposal. My thanks are due to Dr. Roux, Dr. Weinberg, Dr. MacIntosh, Miss Hempl, Captain Armitage, N.Z.M.C., and Sir John McFadyean. I am quite especially indebted to Captain A. Stokes, D.S.O., R.A.M.C., and to Captain Henry, R.A.M.C., for much valuable material and for kind co-operation during the course of the work.

Morphology.

The *Vibrion septique*, like many anaërobes, has a rather wide range of variation in morphology according to the circumstances in which it develops.

Typically, in a young culture in meat medium it appears as a Gram-positive rod of varying length considerably thinner than

B. welchii and in size closely resembling *B. sporogenes;* spores are formed with great freedom, and may be found at any stage of development. They may be centrally placed, and in short rods; they may occupy practically the whole extent of the organism, producing barrel-shaped or clostridial forms. The spores are, however, very frequently subterminal or even terminal; the shape of the fully developed spore is often oblong rather than oval, the ends being slightly flattened.

When grown on inspissated serum the appearance may be extremely varied—club-shaped individuals, bulbous, deeply staining types, filaments and the "navicular" or "citron" forms described later may all be present as well as the rods and spores already mentioned. In Noguchi tubes containing fresh tissue these "citron" and club-shaped individuals may also appear.

Apart from these forms just mentioned there is nothing very characteristic in the morphology of *Vibrion septique* in culture which would distinguish it from other anaërobes.

Motility.

In young (twenty-four hour) cultures and in the freshly taken oedema fluid of recently dead animals the organism is motile.

Cultural Reactions.

The cultural reactions are as follows:

Colony.—Surface colonies are semitransparent and rather delicate; the edges may be crenated, and there may sometimes be a tendency to form flat or branching outgrowths; woolly filaments of the tangled thread type are not formed, and the colonies do not grow down into the medium. Surface colonies require good conditions of anaerobiasis; a serum agar or glucose serum agar medium is favourable to growth. On salicin agar with or without serum the colony is larger, and while it retains its rather translucent character the whole appearance is more robust. Plates should be dried before spreading, as there is a certain tendency for *Vibrion septique* to grow in a uniform surface film instead of in discrete colonies. Good surface colonies can be obtained by stroking a loop dipped in the inoculum over three or four serum agar slopes in succession; one of the slopes generally yields clean discrete colonies which can be picked off.

Deep Colonies.—These have a transparent or semi-transparent appearance; the centre is not very compact, and the edges show coral-like branchings.

Characters in Milk.—When grown in milk, either in an anaërobic jar or in paraffin-covered media in an ordinary incubator, acid is produced, and, finally, after three to seven days, there is clotting, with or without the production of gas. If the sowing has been large and the culture is growing very vigorously the acid and clot reaction may be more rapid and the production of gas more obvious, but the delayed reaction is the more frequent, especially in recently isolated strains.

Broth.—In plain nutrient broth the growth is rather feeble the medium becomes turbid in twenty-four to forty-eight hours and, later, the growth sinks to the bottom of the tube. In glucose broth the growth is very vigorous, and the sinking of the organisms is very striking; this occurs after about thirty-six to forty-eight hours of incubation. There is often a lag of about twelve to eighteen hours during which growth may fail to appear, even when a very vigorous proliferation is about to occur within the next twelve hours.

Meat.—In this medium there is vigorous growth and considerable formation of gas. A vivid pink colour is produced which varies in exact hue according to the constituents of the medium (the colour is darker in heart muscle and brighter in skeletal muscle, etc.); after a time the bacteria sink down so that the fluid above the meat becomes as clear as before inoculation. The colour may gradually fade from the meat on exposure to air. There is no blackening and no putrefactive odour, and the meat does not become soft and friable. Meat covered with paraffin is a very good medium for the cultivation of this organism.

Inspissated Serum.—Vibrion septique grows freely on this medium in an anaërobic jar; there is no liquefaction, not even the faintest pitting of the surface after weeks of incubation. The morphological range of the bacillus on inspissated serum is very great—club-shaped individuals, deeply staining oval or bulb-shaped types, "citrons," and filaments may all occur. Spores are formed very readily on this medium, and a sealed culture may be left on one side for more than a year without any apparent loss of vitality. The subcultures then made show no abatement of vigour and retain their pathogenicity for laboratory animals.

Alkaline Egg Fluid.—The medium becomes uniformly opaque without the formation of a clot.

FIG. 1. — *Vibrion septique*, twenty-four to forty-eight hour meat culture. Mag. 1,500.

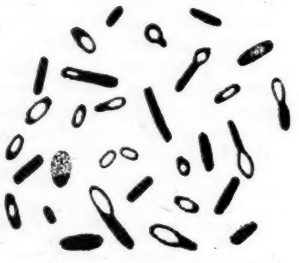

FIG. 2. — *Vibrion septique*, Noguchi tube culture, showing rods, spores, and a "citron" type. Mag. 1,500.

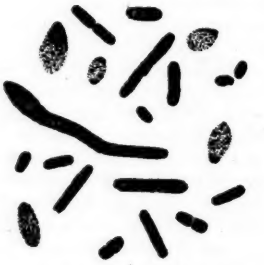

FIG. 3.—*Vibrion septique*, from muscle of guinea-pig. *Post-mortem* specimen; "citrons" and club-shaped type are shown. Mag. 1,500.

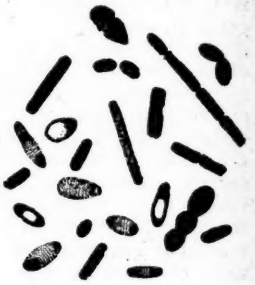

FIG. 4.—*Vibrion septique*, from liver of guinea-pig, showing "citrons," oval and bulb forms. Mag. 1,500.

Noguchi Tubes.—A broth or glucose broth tube into which a piece of fresh liver or kidney, taken under sterile precautions from a rabbit or guinea-pig, has been dropped forms a most excellent medium for the growth of *Vibrion septique*. The citron forms occur in this medium and they afford a useful diagnostic feature.

Sugar Reactions.—These are quite definite, and are set out in the accompanying table; *B. welchii* (one type only), *B. oedematiens*, and *B. chauvei* are also shown for comparison. The medium for these tests may be casein digest broth, to which is added the requisite sugars in concentrations of 1 to 1.5 per cent.; litmus or the alkaline egg fluid, as described by Henry, may be used as indicators. The readings should be made at forty-eight to seventy-two hours. This medium can be used sealed with liquid paraffin. Serum litmus agar slopes made up with the desired sugars can also be used with success but require a good anaërobic apparatus.

Pathogenicity and Animal Reactions.

Vibrion septique is pathogenic for guinea-pigs, pigeons, rabbits, and mice; all the strains dealt with have retained

Table of Cultural Reactions.

Name.	Meat.	Milk.	Inspissated Serum.	Glucose.	Levulose.	Galactose.	Saccharose.	Maltose.	Lactose.	Inulin.	Salicin.	Mannite.	Dulcite.
Vibrion septique ...	Gas: pink colour; no blackening	Acid: clot after 3 to 6 days	No liquefaction	+	+	+	−	+	+	−	+	−	−
B. welchii	Gas: pink colour; no blackening	Acid: rapid clotting with evolution of gas	No liquefaction	+	+	+	+	+	+	*	−	−	−
B. oedematiens ...	Gas: pink colour at first, then bleached	Acid after 4 to 6 days: very slow clotting	No liquefaction	+	+	−	−	+	−	−	−	−	−
B. chauvei	Gas: no blackening	Acid: clot after 3 to 6 days	No liquefaction	+	+	+	+	+	+	−	−	−	−

* Variable according to type.

their pathogenicity for these animals, some of them during years of culture under laboratory conditions. There is a certain variability in virulence, due in part to the conditions of growth. The most virulent cultures are twenty-four hour growths in glucose Noguchi tubes, glucose broth cultures of the same period come next, and ordinary broth is the least favourable medium for inoculation into animals.

The infecting dose for the particular type of laboratory animal used must be ascertained.

In some cases 0.1 c.cm. of a twenty-four hour glucose broth culture, or even less, will kill a 300 gram guinea-pig in twelve to eighteen hours; 0.5 c.cm. to 1 c.cm. is generally a lethal dose for a 300 gram guinea-pig, and the minimal lethal dose can be ascertained if desired. A sublethal dose of a virulent culture may be withstood by a guinea-pig without any symptoms, whereas a very slightly higher dose or even the same dose in another animal of corresponding weight will produce death with the typical lesions. Sublethal doses in guinea-pigs do not appear to produce any reaction. I have in no instance observed the recovery of an animal that had shown any symptoms of infection as a result of the injection of this organism. The occurrence of extensive oedema with subsequent recovery, which is so striking a feature of the reaction of guinea-pigs to sublethal doses of *B. welchii*, is absent when *Vibrion septique* cultures are used.

FIG. 5.—*Vibrion septique*, from liver of guinea-pig, showing long filaments, etc. Mag. 1,000.

Post-mortem Appearances.

These are as follows:

There is an extensive blood-stained oedema, and a considerable amount of gas is developed in all the muscle tissue involved. The muscles affected have a characteristic deep red colour. There may be a collection of fluid in the peritoneal cavity and in the pericardium; this is not as a rule very evident in guinea-pigs which have died in twelve to twenty-four hours, but is a very well-marked appearance in rabbits which have succumbed to the infection after twenty-four to forty-eight hours. The suprarenal bodies may show a variable amount of redness, but this is not so regular nor so marked as in guinea-pigs which have died from infection with *B. welchii*.

There is no putrid odour. The pale digested appearance of the infected muscles so frequently seen in *B. welchii* infections is not seen with *Vibrion septique*.

B. oedematiens in guinea-pigs produces a gelatinous oedema quite colourless, with little or no gas; the muscles involved are pale pink in colour.

Microscopical Appearances.

The microscopic appearances are as follows:

Film preparations stained by Gram's method, made from the muscle of an animal which has died of infection by *Vibrion septique*, show rods and the characteristic citron or navicular forms. They are of very varying length; they have a pale granular appearance, and generally contain a deeply staining portion at one end of the body or at both. Sometimes the granular part may take up the stain with somewhat greater intensity, but there is always a differentiation between the granular part and the deeply staining points. These "citrons" are stages in a type of spore formation that takes place only in the animal host or in the presence of live tissue or in serum. This is not the only type of spore formation which takes place in the host, the ordinary method whereby the spore arises in the rod also occurs. In addition to the "citrons" large club-shaped types which appear to be swollen rods occur—these are not very frequent in muscle; oval or bulb shaped, deeply staining forms, often in short chains, may also be present. It should be noted that if the infection has run a very rapid course and if the *post-mortem* examination has followed immediately upon the death of the animal the "citrons" and spores may not have been formed at all or may be present only in small numbers. "Citrons" also occur in infections with *B. chauvei*, but are not known in any other type of anaërobic infection. It should be noted that *B. chauvei* has not so far been recorded as infecting man.

FIG. 6.—*Vibrion septique*: "citrons" from haemorrhagic blister fluid of patient suffering from gas gangrene. Mag. 1,500.

Films made from the peritoneal surfaces of the liver show a greater or less number of long snaky chains and filaments. These long filaments are characteristic of a *Vibrion septique* infection; they are not found in infections with *B. welchii* nor with *B. oedematiens*. Mice and rabbits show the filaments quite as clearly as guinea-pigs. The citron, club, and bulb forms can be found in the liver as well as in the infected muscle.

Vibrion septique produces septicaemia, and the heart blood taken with aseptic precautions and inoculated into paraffin covered meat medium yields good cultures.

"Vibrion Septique" in Mixed Culture.

Vibrion septique growing with *B. sporogenes* or in mixed culture derived from wounds is extremely difficult to recognize, and even when its presence is suspected it may be a very tedious and lengthy process to unravel it from the other anaërobes present by growing on selective media and plating, etc. The injection of such a mixed culture, either grown in glucose broth for twenty-four hours or from a meat culture, into a guinea-pig or mouse will afford the *post-mortem* picture described above, and moreover the cultivation of the heart blood in meat medium will often give a pure culture of *Vibrion septique*. Should this heart blood culture not be pure at the first passage the predominant organism will certainly be *Vibrion septique*, and plating or a second animal passage will then purify the strain.

Vibrion septique in these mixed injections into guinea-pigs will outrun both *B. sporogenes* and *B. welchii*, and the animal usually dies of a *Vibrion septique* septicaemia, even when both the above mentioned anaërobes are present in the culture inoculated.

Such a mixed culture destined for injection into an animal should, however, always be freed from *B. welchii* by growing for two or three days in milk and then heating to 80° for ten to fifteen minutes; the heated material should be inoculated into meat medium and (after subculture into glucose broth if desired) then injected into the animal. In mixed culture the dose should be 1 to 1.5 c.cm. for a 300 to 400 gram guinea-pig and 0.25 to 0.5 c.cm. for mice.

Vibrion Septique in Wounds.

Vibrion septique, like other pathogenic anaërobes, may be present in wounds both of recent date and of long standing without causing any symptoms in the patient. It may, on the other hand, be responsible for a serious or even fatal case of gas gangrene. These acute infections usually occur within a few days of wounding, but may arise at any time, especially after operation. One of the strains here studied was obtained from a gas gangrene condition arising from the operative treatment of a wound healed for over two years, but which still contained a very small pocket of pus in the scar tissue.

In an active infection with *Vibrion septique* the organism may be present in the discharge from the wound, in muscle, in the fluid from haemorrhagic blisters, in the skin near the wound, and possibly in the blood stream. A careful examination of films from the muscle, or from the blister fluid, should any have been formed, or from the discharge, may show among other organisms the characteristic "citrons" and deeply staining oval or bulb types; rods with or without spores, will also be present, but cannot be distinguished from other bacilli. The worker should familiarize himself with the *Vibrion septique* types as they appear in guinea-pigs, as the recognition of "citrons," etc., in the films direct from the patient affords a valuable and very rapid diagnosis. The injection of the fluid from haemorrhagic blisters or other exudate into a mouse or guinea-pig will produce the characteristic appearances if *Vibrion septique* is present, and cultures should be made at the same time in meat.

If the animal test is not available more time should be spent upon the examination of films, as that may afford an immediate indication of the presence of the organism; demonstration of the organism in culture even under favourable conditions would not provide a definite diagnosis

for some days. The absence of citron forms, etc., must not be regarded as evidence that *Vibrion septique* is not present in the wound. *Vibrion septique* appearing in a wound showing an active condition of gas gangrene should be considered as a serious finding, whether accompanied by *B. welchii* or alone.

SUMMARY.

1. *Vibrion septique* is a saccharolytic organism clotting milk in three to seven days, without putrefactive or digestive reaction on meat or inspissated serum. It is a strict anaërobe.

2. Spores are readily formed upon all media. They are oval in shape, and central or subterminal in position.

3. The organism is pathogenic for man. It is also pathogenic for laboratory animals (rabbits, mice, pigeons, and guinea-pigs) both in pure culture and when mixed with other anaërobes.

4. In the animal body the lesions are a blood-stained oedema and deep red colour of the infected muscles. The organism also infects the blood stream.

5. Characteristic morphological types of the organism are found in the muscles; these are "citrons," club and bulb-shaped forms, as depicted in Figs. 2–4, and 6. On the peritoneal surface of the liver long snake-like filaments and chains are formed; these are specific to the *Vibrion septique* type among the pathogenic anaërobes at present known.

6. The citrons and also the deeply staining oval or bulb types may be met with in muscle tissue and in the fluid from haemorrhagic blisters in man in cases of active infection with this organism. This affords an immediate and valuable diagnosis, but a failure to find these types does not constitute evidence that the case is free from an active infection with *Vibrion septique*.

APPENDIX.

Casein Digest Medium.[1]

To a 2-litre flask containing 1 litre of tap-water add 20 grams of anhydrous sodium carbonate. Transfer the flask when boiling to a water-bath and add 200 grams of casein, dusting this in gradually to avoid the formation of lumps; then place the mixture in a large Winchester quart bottle, allow to cool down, and add 3 grams of pancreatin with 15 c.cm. of chloroform. Incubate at 37° C. for five days, shaking vigorously from day to day to break up the crusts that have formed, then add 3 more grams of pancreatin and incubate for ten days longer. After fifteen days' digestion in all the mixture is treated with 400 c.cm. of N/1 HCl, steamed for thirty minutes to drive off the chloroform, and then filtered. The filtrate is treated with 120 c.cm. of N/1 NaOH, and its reaction is adjusted to PH = 7.3, using either the hydrogen electrode or phenol-sulphonephthalein as an indicator in a Marriott scale. The resulting stock broth is diluted with two parts of 0.5 per cent. NaCl in tap-water before use, the reaction being again adjusted if necessary.

The sugars required can be added to this.

Serum Agar Sugar Medium.[2]

Ordinary agar 75 c.cm., sterile serum 25 c.cm., litmus solution 5 c.cm., to which 1 gram of the required sugar has been added and sterilized by steaming. The medium is made up as for ordinary serum agar.

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[1] Henry: *Journ. of Path. and Bact.*, vol. xxi, 1917. [2] MacIntosh: Special report No. 12, Medical Research Committee.

TREATMENT AND PROPHYLAXIS OF MALARIA.

BY

COLONEL C. A. JOHNSTON, C.B., I.M.S.

A GOOD many articles on the subject of the treatment of malaria have appeared recently in medical journals,[1] evidently because many men suffering from this disease have been invalided to Europe as the result of the war. A certain amount of apprehension must be felt as to the after-effects of some of the lines of treatment advocated. Time and experience can alone settle the questions raised, but, as a contribution to the subject, I desire to draw attention to a memorandum I wrote for the P.M.O., H.M. Forces in India, in 1901, on the use of hypodermic injections of quinine in malaria. The method (which was described in a review of the memorandum published in the BRITISH MEDICAL JOURNAL of March 29th, 1902, p. 793) has stood the test of time and experience. Since writing that memorandum (about seventeen years ago) I have had no reason to deviate one iota from the dicta I then laid down. Other medical men who have made independent observations on these statements of mine have corroborated them.

As I have had uniformly good results from this treatment, I think it will be useful to give a summary of it, for it seems to have dropped out of mind. I must in the first place strongly insist that the technique for the hypodermic injection must be carried out as laid down, otherwise grave results may occur. It must not be thought that quinine injections can be given hypodermically in the same free and easy way as a hypodermic injection of morphine. In the second place, I wish to make it clear that I do not recommend intramuscular injections, but hypodermic, that is, below the *cutis vera*, and above the fascia of the muscles.

Requirements.

1. An all-glass 20 m hypodermic syringe with stout needles, thoroughly sterilized.
2. Saline solution 0.5 per cent., sterilized.
3. A wide-mouthed test tube about 3 in. long, sterilized.
4. Carbolic oil 5 per cent. and some cotton-wool.
5. *Pure* quinine bisulphate 4 grains.
6. Spirit lamp.

Method of Subcutaneous Injection.

Prepare the patient's flank between the iliac crest and the last true rib by cleansing with soap and water, and then smearing with carbolic oil on wool (I do not like tincture of iodine if it can be avoided).

(*a*) Put the 4 grains of quinine bisulphate into the sterilized test tube.

(*b*) Fill the syringe with the 0.5 per cent. saline solution; squirt this into the sterilized test tube to dissolve the quinine powder.

(*c*) Heat the quinine solution in the spirit flame till it comes to the boiling point.

(*d*) Fill the syringe with this boiled quinine solution.

(*e*) Dip the needle into the carbolic oil.

(*f*) When the solution cools down to about 100° F., pick up between finger and thumb of left hand (with carbolized cotton-wool intervening) a good lump of the cutis vera in the flank; plunge the needle in up to the hilt (eyelet downwards) into the subcutaneous tissue; sweep the point of the needle from side to side through the connective tissue, describing the arc of a circle, thus breaking down any small trabeculae, and freeing the point of the needle from any fat globule it may be in, and then inject all the solution into the space thus formed; withdraw the needle quickly; massage the flank with the carbolized cotton-wool to disseminate the fluid as much as possible.

If the above directions are carried out properly, I guarantee that the patient does not feel the uncomfortable sensation of burning or pain; and, strange as it may appear, many of my patients never know when the injection has begun or when ended; in fact, the only remark they make is that they felt me pinching up their skin!

The injection is to be given—the method described being strictly observed on each occasion—once daily for five consecutive days in alternate flanks. In addition, $\frac{1}{20}$ grain arsenious acid should be taken by the mouth, and also 5 grains (only) of quinine well diluted, in the early morning daily; the arsenious acid and the quinine should be continued for a month.

The treatment described is all that is required for an uncomplicated case of malaria, but the complications of malaria may be manifold, such as congested liver and disordered action of stomach and bowels, with loss of appetite and constipation. Measures for the treatment of these conditions on ordinary lines should be taken, but must be regarded as adjuncts to what I call the specific treatment by hypodermic injections of bisulphate of quinine.

For chronic relapsing cases of malaria, with enlarged spleen and liver, the same specific treatment is undertaken, but the five hypodermic injections are repeated every fortnight (together with local treatment of the "ague cake" spleen, by counter irritation producing a mild splenitis, etc.) till the spleen or liver becomes normal.

An important point to which I wish to draw attention is not to overdose the patient with quinine by the mouth, thereby upsetting the digestion and ruining any benefit he

derives from assimilation of his food, which gives him a chance of building up his natural resistance to infections generally, whether malarial or other. It should be remembered that the malarial patient has been robbed of a good deal of his haemoglobin by the parasite, and this has to be replaced by his own metabolism; therefore his *primae viae*—liver and other organs—should be given a chance of doing their duty, and his digestive system should not be upset by heroic doses of quinine by the mouth. It serves no useful purpose, but only intoxicates the patient and every tissue of his body, and does not produce the full parasiticidal action of quinine, weight for weight, against the malaria protozoon.

For the information of general practitioners and accoucheurs I may state that quinine given by this hypodermic method can be safely administered to pregnant women—at least that is my personal experience of many cases, and I have never heard of any untoward event in such cases in the hands of any medical man who has used it in India.

I have never advocated the intramuscular injection of quinine, for the big doses used produce local necroses (so-called cold abscesses) in the muscle; this statement has recently been verified by Major MacGilchrist, I.M.S.,[2] by a *post-mortem* examination of a case fatal thirty-six hours after such an injection (11 grains of quinine bihydrochloride) into the gluteal muscle. This case serves as an object lesson to those who advocate the administration of quinine by intramuscular injection.

I saw many cases of cerebral malaria in the German East African campaign in the field far remote from the base hospitals (some of them mistaken for cerebro-spinal meningitis), and most of these cases recovered when treated on the lines recommended by me, by hypodermic injections. I have no doubt the intravenous method, as recommended by Sir Leonard Rogers, would produce just as good results, but it is not practicable for sections of field ambulances to carry about the more elaborate equipment for intravenous saline injections, in preference to the simpler and safer equipment for hypodermic administration, especially in the bush of Africa and similar terrain.

Prophylaxis.

As regards the prophylaxis of malaria, I hold, as do many other medical men, that the daily dose of quinine is not a prophylaxis against malaria; recent investigations and experiments on this question by Lieut.-Colonel Anderson, I.M.S.,[3] on gaol populations, showed that quinine as a prophylactic was useless and a distinct waste of public money, for the price now of quinine is enormous.

From a scientific point of view I ask this question: "If you state you are sterilizing a medium (that is, cinchonizing the patient's blood) in order to prohibit the growth of a parasite by daily dosing with quinine, and then find that, after all, this parasite does develop in this medium (through some specially enlisted resistance on the part of the parasite to its environments or any other explanation you like), how are you now going to kill (sterilize) by medication this parasite that has learnt to grow in this cinchonized medium? Are you going to increase the cinchonization of the medium by adding more quinine, and thereby teach the parasite to resist further and remain dormant in this medium till such time as he can regenerate?" Obviously the answer is in the negative. Then why do it? For this is the cause of chronic and relapsing malaria, in my opinion; so the only option apparently left to the physician to cure the case is to poison both patient and parasite by heroic doses of quinine and develop in him some other chronic ailment the result of quinine poisoning, the commonest of which is permanent deafness.

Of course it is understood that occasionally cases of malaria gravidarum occur which have to be tackled heroically to save life, but such cases are not now being considered.

The views here stated will, I know, be criticized by those who advocate doses of gr. xv to xx once weekly on Saturdays, or bi-weekly, on the grounds that they have not thereby "cinchonized the media," but have by this means caught the young parasites already there which would ultimately fulminate into a recognized attack if they were not killed. If this theory is right, and really represents what has actually occurred, then of course the answer is that the dose of quinine given has been not a prophylactic but a curative dose, and if no malarial outburst occurs an actual infection of the parasite in the medium (blood) has been inadvertently sterilized. But prohibition of the infection, which is prophylaxis, has not been accomplished. Moreover this method (gr. xx once a week) has not kept people immune against malaria, and has therefore failed as a prophylactic.

A further criticism I have heard is contained in the theory that although quinine given prophylactically does not actually immunize the patient against an attack, yet it modifies the toxic action of the parasitic infection, so that only a mild attack is produced—as an anti-typhoid injection acts as a prophylactic. Against this theory I advance my practical experience in the East African campaign. I have never seen so many cases of cerebral malaria, haemoglobinuria (blackwater fever), in all my twenty-eight years' experience in the tropics as I saw in East Africa, yet every one who could was taking quinine prophylactically.

Finally, the only prophylactic medication against malaria for armies in the field, in my opinion and experience, on the ground of practical politics, is arsenious acid $\frac{1}{30}$ grain daily, thereby keeping up the natural resistance of the body generally against many ills, not only malaria. There need be no fear of the cumulative action of arsenic, for the troops very often do not get access to the drug, and a break from the drug can always be arranged for one week every month if necessary. It is easier to stop issuing a drug than to supply it regularly.

A golden rule for tackling the question of malaria for the armies in the field is "arsenic as a prophylactic and quinine as a curative only." Yet this is no new precept, for the Italians have done this years ago.

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EPIDEMIC POLIOENCEPHALITIS.

(SO-CALLED EPIDEMIC BOTULISM.)

BY

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PART II.

IN considering the nature and cause of the present epidemic of cases, many of them presenting paralysis of cranial nerves, which in a recent contribution to this JOURNAL I have designated as polioencephalitis, it is well to bear in mind—in view of the fact that they have been so widely referred to as cases of botulism—that somewhat similar symptoms may occasionally be the result of diverse causes. In both botulism and polioencephalitis paralyses of cranial nerves are features in common, and Van Ermengem, in his classical paper on the outbreak of botulism in Ellezelles, lays stress upon this point. He states that "in the absence of the previous history" (of poisoning having occurred), "it is impossible to distinguish with certainty cases of botulism from bulbar paralysis (Erb's syndrome), subacute polioencephalo-myelitis, and certain ophthalmoplegias."

Polioencephalitis.

Everybody who has paid attention to the subject now recognizes that there exists an acute primary specific disease affecting the grey matter of the brain, of which sporadic cases are not uncommon. This malady, known as cephalitis or polioencephalitis, was first described by Strümpell in 1884, and, in the form which not uncommonly leads to the development of spastic hemiplegia in young children, is fairly familiar. It is comparable with acute anterior poliomyelitis (infantile paralysis), and, like that disease, often occurs in children, is of acute onset and tends towards recovery. It may or may not be associated with such general symptoms as fever, convulsions, headache, stupor or loss of consciousness, or pronounced irritability. The special symptoms produced by the disease depend, of course, upon the particular region of the grey

matter of the brain involved. For example, polioencephalitis *superior*, which affects the nuclei of the cerebrum and cerebellum, may give rise to marked mental changes, coma, hemiplegia, diplegia, and ataxia, while polioencephalitis *inferior*, which affects the nuclei of the pons and medulla, may cause paralysis of one or other or several of the cranial nerves, and combinations of the two may be met with.

The evidence, both clinical and pathological, goes to show that these affections of the grey matter, whether of the brain or spinal cord, are in reality one and the same disease, and are due to a single factor. Recent researches have demonstrated that this factor is a living contagium, since it has been shown that the contagion can be conveyed indefinitely from monkey to monkey by inoculation, though the organism, which is so minute as to pass through the Berkefeld filter, has not yet been for certain isolated. The two affections may occur in epidemics, in which some members of the same family may suffer from the spinal and others from the cerebral variety. Indeed cases are known in which such eye symptoms as ptosis, ophthalmoplegia, and pupillary changes have been associated with affection of the spinal cord, and the combined condition has been termed polioencephalomyelitis.

Stephenson[1] relates a series of sporadic cases over a considerable period in which affection of the ocular muscles was the most prominent feature, and to his excellent introductory remarks on the nature of the disease I am much indebted. The majority of his cases were in children, and consisted mainly of simple oculomotor paralysis, most commonly of the external rectus alone, but in others of various branches of the third nerve. There were associated symptoms in eight cases out of twenty-eight, such as fits, unconsciousness, sleepiness, and loss of energy.

The cases that have been recently described accord in general with this description, and with that of other writers, of sporadic cases of polioencephalitis, and the case that I saw in 1913, which was generally recognized to be of this nature, would unhesitatingly be classed among the epidemic cases had it occurred in the past few months. One feature in that case, which at first made me distrust the diagnosis of polioencephalitis and favour that of cerebral tumour, was the presence of optic neuritis, but I subsequently found that this, though not a common feature, yet was occasionally met with in polioencephalitis, and it is paralleled by two, at any rate, of my present series. Most of the cases are subacute, the paralysis mostly develops suddenly, but in several certain phases of the paralysis were delayed for days or even weeks. The pupils have not been dilated, nor has there been paralysis of accommodation in any of my cases.

Botulism.

Now with this picture of polioencephalitis let me compare that of botulism, mainly relying on Van Ermengem's description.[2] In his cases, which occurred after eating an infected ham (raw after the foreign fashion), there was a sudden onset of symptoms after a period of twelve to twenty-four or at most thirty-six hours. These consisted of thirst and a feeling of constriction of the throat, soon followed by paralysis of accommodation and other ocular paralyses. The paralysis for near vision and the dilatation of the pupils were constant symptoms, and double vision, squint, and ptosis, were usually met with. In the more severe cases difficulty of swallowing, or inability, supervened, with loss of voice, constipation, and retention of urine. Fever and disturbance of sensation or consciousness were absent, only in the very last stage of fatal cases did coma or a mild delirium develop. The fatal cases were characterized by gradually advancing respiratory and cardiac failure due to progressive bulbar paralysis. About one-third of those who had eaten the poisonous food died in a few days; another third, after more or less severe symptoms, got well; the rest, who had only taken very small amounts of the infected flesh, remained free from symptoms. In those that recovered the ocular paralysis began to improve after two to three weeks, though in some it was several months before the paralysis of accommodation got completely well. The general weakness, which was a characteristic feature, also took several weeks to recover.

Differential Diagnosis.

The likeness between the two conditions rests upon the occurrence of ocular paralysis in each, particularly the double vision, squint, and ptosis. Apart from this striking feature difference outweighs resemblance. In botulism the onset is sudden, with urgently acute symptoms coming on after partaking of some often definitely recognizable poisonous article of diet. There is dryness and a sense of constriction in the throat, with dilatation of the pupil and loss of accommodation; there is great bodily prostration but no psychical change, and there is early death or early cessation of the acute symptoms with slow convalescence. In the cases in this epidemic and in other cases of polioencephalitis these features are in the main wanting. The onset is either subacute, or the development of the paralysis may be spread over several days, or even weeks. There is no feeling of constriction of the throat, no dilatation of the pupil, no loss of accommodation. There has been little bodily prostration in the cases I have seen, except in those cases of polioencephalitis *superior* in which the grey matter of the cortex is involved, when it is associated with psychical changes—sleepiness, lethargy, coma, and delirium—which are absent in botulism. The majority of cases recover; if not, the fatal ending comes after a course of two or three weeks or more, though occasionally earlier.

But the most striking difference lies in the mode of occurrence of the outbreaks of the two conditions. In botulism, almost without exception, the disease occurs in groups, varying in their numbers but including most of those who have partaken of the infected food. Since sometimes the infection of the food is limited to certain parts, those who eat of the non-infected parts may escape; but though the groups may thus be diminished in size it remains true that botulism, as hitherto recorded, is a "group infection." On the other hand, it is notable that in the present epidemic in no instance, so far as cases have yet been published, has any group infection occurred. The cases have been widely scattered, sometimes two in the same neighbourhood, but no two even in any instance in the same house. This might be thought to prove too much, since it might be supposed to disprove the infectious, and hence infective, character of the disease. But it is well recognized that epidemics of other diseases commonly show similar features. It is often very difficult in the case of diphtheria, enteric fever, or cerebro-spinal meningitis to trace the mode of infection in the numerous scattered cases that constitute an epidemic, but it is now proved that the symptom-free carrier or the individual with minimal and unrecognized symptoms plays an important part in such diffuse epidemics. Poliomyelitis in its epidemic form is known to fall into the same category; and such, I take it, is the true explanation of the apparently unrelated cases in the present epidemic. It is a truism of epidemiology that if the movements of contacts are only worked out with sufficient care and thoroughness, indirect connexions between apparently isolated cases in epidemics of the above diseases can almost always be established.

It is probably true that during the last few months, during which the supply of fresh meat has been so greatly restricted, more tinned food has been eaten in this country than ever before. That tinned food may occasionally become accidentally infected with the *Bacillus botulinus* is a well-known fact, but, as I have argued, the incidence of this epidemic is quite different from the incidence of such attacks of botulism as would thereby be produced. The only conceivable way in which such a distribution could occur would be on the supposition that there was a widespread infection of tinned food with a bacillus of attenuated virulence. In such a case there might be extensive ingestion of small doses of its toxin so small that only those with special susceptibility to its action, or those who ate specially freely of tinned food, showed symptoms of poisoning. This is exactly what is met with in ergotism, in which widespread epidemics may occur, due to poisoning of the bread with the ergot of rye, and in the slighter epidemics, when the degree of contamination is low, the disease may pick out sporadic victims in the midst of general immunity. However, though I mention this possibility, there is no reason to suppose that it represents the facts of the present epidemic, since, so far as investigation has gone, there is no evidence at present of any widespread or even occasional

infection of tinned food with *B. botulinus*. Moreover, certainly one of my patients has disclaimed ever having taken tinned food at all; and its relative infrequence among soldiers from abroad who have lived very largely on tinned food is significant.

Prognosis and Treatment.

It remains now to speak of the prognosis and treatment. In the majority of cases recovery occurs, though there is more likelihood of a fatal termination in those cases of the *superior* type; even here, however, recovery may quite unexpectedly take place. But what is of importance is that we are able to hold out to the patient's friends the possibility of recovery from a condition which, but for our knowledge of its nature, we should otherwise regard either as absolutely fatal or as the commencement of a chronic incurable disease, since different cases may simulate cerebral tumour, tuberculous meningitis, or the onset of disseminate sclerosis. The recovery from paralysis may be incomplete, as in poliomyelitis; it is too soon to speak for certain of this in the present epidemic, but some, at any rate, have made a full recovery.

Treatment seems to have little influence on the course of the disease, but, as in poliomyelitis, we should resort to complete and absolute rest in the dark, with or without the use of bromides or other nerve sedatives, during the stage of onset. Urotropin has been given, from a belief in its antiseptic effect on the central nervous system, and salol for a similar action on the nasopharynx, by which route infection is supposed to reach the brain. Lumbar puncture should be performed and, if necessary, repeated in cases which show the more marked signs of intracranial pressure, such as severe pain in the head, vomiting, and unconsciousness. Later, tonic treatment, such as iron, arsenic, strychnine, and cod-liver oil, with fresh air, are likeliest to restore the vitality of the damaged nerve centres.

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THE "THICK DROP" METHOD FOR THE DETECTION OF SCANTY SPIROCHAETES IN THE BLOOD.

BY

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(ATTACHED R.A.M.C.)

(From the Military Laboratory, Jaffa, E.E.F.)

IN the majority of cases of Palestine relapsing fever (among British troops) which have come under my notice the spirochaetes have been throughout present in the blood in very scanty numbers. This has entailed a prolonged search before the diagnosis could be established; frequently a negative finding has had to be returned, as films cannot be carefully scrutinized in their entirety when a large number have to be examined. On several occasions the spirochaetes have first been demonstrated, after considerable search, at the second or even third time of examination of the particular case.

I have therefore made use of the "thick drop" method, which has proved of much service, not only saving time, but also frequently enabling me to report as relapsing fever, cases in which the examination of an ordinary blood film yielded no result.

To prepare a thick drop for examination, a small drop of blood is placed upon a clean slide. The drop should be about as large as is required for making a good-sized smear and should be spread out a little (with the needle) so as to cover an area about $\frac{3}{8}$ in. in diameter. Too thick a drop is not an advantage, as it is difficult to lake (dehaemoglobinize) completely, and more fibrin is present. The drop must be allowed to dry thoroughly, and before proceeding to lake it, may be gently heated by passing it over a flame two or three times.

There are several well-known methods of laking the thick drop. I have made use of two: (*a*) Distilled water, or (*b*) acidulated methyl alcohol.

(*a*) A few drops of distilled water are poured upon the thick drop, and the slide is gently agitated to and fro. The water may be renewed until the blood has completely lost its colour. The process takes four or five minutes, depending on the thickness of the drop.

(*b*) Methyl alcohol acidulated is used in the proportion of 10 or 12 drops of HCl to 50 c.cm. of methyl alcohol; the procedure is the same as in the former case, but the laking takes rather longer. After the colour has been extracted, the drop is well rinsed with distilled water and dried.

Dehaemoglobinization is more complete and rapid by the former method, and there is less formation of fibrin. But unless the greatest care is exercised, the drop, or portions of it, are apt to be removed from the slide, in spite of complete drying (as there has been no proper fixation previously). If distilled water is used, and the preparation is to be stained by gentian-violet, it is advisable, after carefully draining off the water when the laking is complete, to pour on a few drops of methyl alcohol, for a minute or two, to fix the preparation to the slide.

The thick drop may be stained by the Giemsa or Leishman method, or with aniline gentian-violet; the last gives excellent results with spirochaetes, the intensely blue-stained parasites standing out well from the surrounding elements. Aniline gentian-violet is used in the proportion of 9 parts of aniline water to 1 part of alcoholic gentian-violet, the stain being left on for twenty seconds or so. The preparation is then well washed with distilled water, by which means the requisite degree of extraction and differentiation can be obtained, and finally dried.

Where examination is desired for suspected malaria or relapsing fever, it is a useful plan to have the slide sent in with both a fair-sized film (extending, say, over two-thirds of the slide) and a thick drop (on the other third) upon it. For staining, the smear can be separated from the drop by drawing a line with a grease pencil across the slide, between the two. The smear is stained by the Giemsa or Leishman method, and if no malarial parasites are found, nor spirochaetes quickly seen, the thick drop is used. If it is desired to examine the drop also for scarce malarial parasites (for example, crescents) as well as spirochaetes, the second method of laking is to be preferred, as distilled water is very liable to disintegrate malarial parasites; and in this case the Giemsa or Leishman method must be used for staining.

INTERNAL DERANGEMENTS OF THE KNEE-JOINT.

BY

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DURING the past eighteen months several patients have been sent to the Military Hospital, Tidworth, on account of painful cicatrices on the inner side of the joint. In all cases the cicatrices were the result of linear incisions down the inner side of the joint in line with the patella and ligamentum patellae, over the prominent part of the internal condyle. The history was of an operation performed for some internal derangement of the joint. This has been especially noticeable in cavalrymen.

Since September, 1916, it has been found advisable to segregate the knee cases, owing to the large number, principally the result of football accidents, but at one time a number of injured knees followed trench training. There has been on an average at least twenty cases in hospital daily suffering from derangements of the knee-joint the result of injury.

They practically all suffered from traumatic synovitis, some simple, the others with complications.

The most frequent complications were:

Firstly: Rupture of some fibres of the internal lateral ligament, indicated by acute pain on pressure over the inner side of the internal condyle.

Secondly: Looseness with partial or complete dislocation of the internal semilunar cartilage, indicated by pain on pressure over the site of the anterior end of the cartilage, inability to completely extend the joint, and a history of "locking."

Thirdly: A general stretching of the ligaments was the only objective symptom, besides the synovial effusion. This applied more especially to the posterior crucial ligament, which is the one ligament of the joint put on the

stretch, both in full extension and full flexion, the latter movement being only checked by the contact of the leg with the thigh.

Fourthly: Loose bodies in the joint, such as chips of cartilage, pedunculated outgrowths, and occasionally pieces of shell.

Treatment.

For simple traumatic synovitis, with marked effusion, probably sometimes haemorrhagic, it has been found that three weeks in hospital is sufficient to enable the patient to be sent as a convalescent for a short period of gentle exercise with massage if necessary. Cases with internal complications have required longer. Out of the total of some 550 to 570 cases which have passed through the hospital during the eighteen months, about twenty-five have been operated on. Only men under 40 years of age, with decided symptoms, and likely to be rendered efficient for A 1 class, have been chosen for operation, and only after careful treatment has failed to improve the condition.

Colonel Jones's method of bloodless operation with tourniquet has been used in every case. The incision has been made down the inner side of the ligamentum patellae, to half an inch below the superior margin of the tibia, then curving inwards to a little beyond the outer margin of the internal lateral ligament. The incision is crescentic. A flap of skin is dissected up and wound cloths applied; with a fresh knife a similar flap of the capsule, but slightly smaller in circumference, is dissected up reaching to the anterior lower margin of the internal lateral ligament. This exposes the terminal branches of the anterior internal articular vessels; these are tied, arteries and veins. The synovial membrane is then divided transversely just above the internal semilunar cartilage. This gives a very full exposure of the joint, the crucial ligaments being fully exposed.

When the offending part has been removed, the synovial membrane is stitched with fine catgut, the capsule drawn down and stitched separately, and finally the skin. By this means three layers of tissue in a valvular manner guard the opening into the joint, and the skin incision is well below the internal condyle of the femur and away from all pressure when riding.

Among the cases operated on, in two cases the internal semilunar cartilage was found completely dislocated and lying between the condyles of the femur. In the majority it was the internal semilunar cartilage which was at fault, but in several only pedunculated outgrowths from the infrapatellar pad, or edges of the cartilage, were the cause of the trouble.

This method of operation has proved satisfactory; only one case gave the least trouble, but eventually recovered completely, and the patients have expressed themselves as thoroughly satisfied. Incisions over the condyle of the femur, in whatever direction, always give rise to annoying symptoms afterwards.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

TUBAL ABORTION WITH CYSTIC DEGENERATION OF THE OVARY ON THE SAME SIDE.

MRS. G., aged 25, a healthy woman (2-para; previous labour normal, two years ago), on the morning of August 12th, 1911, felt sick and out of sorts and suffered from dysuria. Towards evening acute pain in the abdomen set in suddenly and she vomited frequently; there was also a show; she thought she was about eight weeks pregnant, having missed two periods. I saw her about 10 p.m., and found her looking rather pale with a rapid (105) but strong pulse, temperature normal. There was a very slight red vaginal discharge; but, as it had really amounted to little all day, and examination showed no signs of unavoidable abortion, I prescribed opium 2 grains. She soon went to sleep, but woke up about 4 a.m. with violent abdominal pain, intense sickness, and an increase of the vaginal discharge. At 5 a.m. I found her suffering acute pain in the abdomen, principally referred to the umbilicus, and the back. Pulse 120, rather small and compressible, but regular; temperature 99°, and respiration 30. Her expression was anxious, and she said she felt she was going to die.

Examining under chloroform, I found the uterus slightly enlarged, but not quite of the normal size in an eight weeks' pregnancy. It lay in the natural position, but there was a mass behind and to the left, continuous with it and filling a great part of the left pelvic cavity. Extra-uterine gestation was diagnosed, and the patient was removed to the Cottage Hospital. Meanwhile $\frac{1}{6}$ gr. heroin and $\frac{1}{200}$ gr. trinitrin were given hypodermically. Upon opening the abdomen I found the pelvic cavity full of dark blood clot; when this was removed an ovarian cyst was seen about the size of a large orange on the left side, while the left tube curled round behind it with its fimbriated end underneath the cyst. I could find no rupture in the course of the tube, which was almost normal in appearance, but slightly enlarged; upon freeing it from under the cyst I found the fimbriated end much enlarged and broadened out, coated with congealed blood, and oozing slightly. An ectopic gestation had apparently been lodged in the fimbriae and had aborted into the abdominal cavity, but I think the pressure of the cyst lying on the top of the fimbriae had to a great extent prevented the dangerous haemorrhage usual in such cases; in fact no fresh bleeding could be seen until the fimbriae had been freed, and then only a slight oozing. The tube and the cyst were removed, the peritoneal cavity cleansed, and the patient put back to bed. Except for a vaginal discharge containing some membrane (no complete cast came away), which was probably decidual, and which ceased in a week, the patient made an uninterrupted recovery, and left the hospital one month after the operation. The right ovary was also degenerated and of about the size of a large walnut, but as it had some healthy ovarian tissue, I did not remove it. The woman gave birth to a healthy female child thirteen months later. I searched the blood clot carefully, but could not find the ovum; the cyst showed no signs of torsion, and was easily removed.

I think this case of a tubal abortion and ovarian cyst on the same side must be somewhat rare. The evidence seemed to point to the left ovary having been useless as an organ of generation, so that the ovum in this pregnancy must have come from the right ovary to the left tube; the fact that conception took place in the fimbriae almost proves the peritoneal method of transit. I am also persuaded that the pressure of the cyst hindered what might have been a critical haemorrhage. The patient's menstrual history previous to this had always been normal in quantity, of twenty-eight days' type, and four days' duration, and her urine at the time contained no abnormal constituents.

Penrith. ROBERT B. JOHNSTON, F.R.C.S., M.R.C.P.E.

AVULSION OF THE EYEBALL IN BIRTH.

THE note in the JOURNAL of April 6th, p. 415, recalls a case to which I was called by a midwife on April 1st, 1904. The woman, aged 33, had an extremely prominent sacrum, rendering the antero-posterior pelvic diameter very small. In the early stage of each of her two previous pregnancies she had suffered from retention of urine from incarceration of the gravid uterus needing manual replacement. The first child, labour at the eighth month, was delivered alive by forceps; the second—a breech presentation—was still-born owing to delay in getting the head past the sacrum. I found that she had been in labour for twenty-four hours; the vertex presented high up with the occiput to the right. Chloroform was administered and forceps applied at once; after very strong traction the child was delivered with the right eyeball lying on the cheek; the inner canthus was torn, the tear extending about one inch across the lower lid along the margin of the orbit, and the superior oblique muscle could be seen torn away from the trochlear. I replaced the eyeball and put three or four fine sutures on the lower lid and canthus; the wound healed by first intention.

There can, I think, be no doubt that the eye was in this case not injured directly by the forceps, which were applied without difficulty, as the marks of their pressure were quite plain on the left temple and right occipital region. The cheek, which was rather prominent, appeared to have been lodged against the prominent sacrum, and the friction in delivery tore through the skin and

avulsed the eyeball. The boy is now a strong, healthy lad with an outwards and upwards squint, and the eye useless for effective vision though not blind. At a later pregnancy the mother, by the advice of a London physician, underwent Caesarean section and ovariotomy, but unfortunately died about the tenth day from intestinal obstruction.

Burton-on-Trent. J. H. JOYCE, M.B., B.C.

ABSENCE OF SPLEEN.

THE following case, in which the spleen was completely absent, appears worthy of record:

J. F., of black race, aged 56, male, was admitted to the Public Hospital, Georgetown, Demerara, British Guiana, by Dr. T. B. MacQuaide, suffering from a strangulated right inguinal hernia, on October 8th, 1917. Death occurred on the same day, and at the *post-mortem* examination performed by me the spleen was found to be completely absent; there were no splenunculi to be found, nor was there any splenic artery.

On reference to Adami's *Principles of Pathology*, second edition, I find that at that date, 1911, about thirteen cases only were on record of complete absence of the spleen.

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Reports of Societies.

ETIOLOGY OF TRENCH FEVER.

AT a meeting of the Society of Tropical Medicine on May 17th Major BYAM, R.A.M.C., gave particulars of the experiments tracing the infection of trench fever to the louse, carried out, as already announced, for the Trench Fever Investigation Committee, of which Major-General Sir David Bruce, K.C.B., F.R.S., is chairman. As has been shown by previous reports in the JOURNAL, the prophylaxis of the disease centres round the destruction of lice. The disease is of considerable importance to the army owing to the invaliding it produces, and may become of importance to the civil population if infected men returned to homes where lice existed. In a paper by McNee, Renshaw, and Brunt, published in this JOURNAL on February 12th, 1916, it was shown that trench fever was a distinct disease and that the infection could be transmitted from one person to another by injections of blood. Evidence was also adduced that the infective agent was to be found in the blood corpuscles themselves. McNee and his colleagues were unable to say how the disease was transmitted in nature, but they pointed out that it was either contagious from man to man, or, what they thought more likely, was carried by one of the common flies or parasites found in the trenches. The evidence for suspecting the body louse was conflicting when the Committee took the matter up. Attempts to transmit the disease by means of the bites alone of infected lice proved entirely unsuccessful. The infectivity of the excreta was then tested. Major Byam described a series of experiments in which excreta were collected from entomological boxes containing 576 lice, all of which had been fed on many cases of recent trench fever during the previous twenty-seven days, the last feed being six hours before the time of collection. The excreta obtained were dry and in fine powder. A volunteer having been obtained, a small surface on the outer side of the arm was lightly scarified, so that blood was just drawn. A portion of the collected excreta was dusted into this blood and rubbed up into a paste with a sterilized needle. The scarified area was allowed to dry, and the shirt sleeve pulled down without any dressing. Eight days later a febrile illness, believed to be undoubtedly trench fever, commenced, and a relapse followed on the sixth, seventh, and eighth days. The experiments were repeated on other volunteers, and the conclusion was clear that the excreta of lice fed on trench fever patients were capable when applied to an abraded skin area of producing a febrile illness similar in its relapsing character and general clinical picture to the disease known as trench fever. The disease was transmitted by intravenous injection of the whole blood from one of the volunteers suffering from trench fever; the unfiltered serum, after being centrifugalized, did not transmit the disease. Experiments with lice known not to have fed on cases of trench fever were negative, so that it was concluded that trench fever is not a disease caused by normal lice. Cultures of the excreta from these normal lice experiments showed what was taken to be the organism described by Jungmann as the organism of trench fever. This diplococcus would therefore appear not to be the cause of the fever. Major Byam summarized the results of the experimental work as follows:

1. The whole blood from febrile trench fever cases up to the fifty-first day of disease, when injected intravenously, was capable of reproducing the disease. *The incubation period in such infections varied greatly—from five to twenty days.*
2. The virus as contained in the circulating blood was destroyed by the addition of distilled water in large quantities.
3. The bites alone of infective lice did not produce trench fever.
4. The excreta of infective lice when applied to a broken surface of skin readily produced trench fever. *The incubation period of such infections was remarkably constant and averaged eight days.*
5. The excreta of lice fed on trench fever patients were not infective till the expiration of not less than eight nor more than twelve days from the commencement of the feeding on trench fever blood, thus indicating a developmental cycle in the louse or a period during which the organism multiplied.
6. Once lice were infective they remained so till at least the twenty-third day from the date of their infection.
7. The virus of trench fever, as contained in infected louse excreta, was capable of withstanding drying at room temperature, exposure to sunlight, keeping for not less than sixteen days, and heating to 56° C. for twenty minutes.
8. 80° C. for ten minutes destroyed the virus, which was therefore not a spore-bearing organism.
9. The bodies of infected lice when crushed upon the broken skin were capable of producing trench fever. When lice became so infective remained to be determined.
10. Infection probably did not take place by the mouth or by inhalation.
11. The excreta of lice were not normally capable of producing trench fever.
12. Trench fever infected lice did not transmit the disease to their offspring.
13. There was a possibility of some attacks of trench fever being afebrile throughout.
14. The percentage of individuals naturally immune to trench fever was exceedingly small.
15. Old age was no bar to infection.
16. Such immunity as resulted from an attack of trench fever was not permanent, and might only persist for so long as the individual showed evidence of the disease.
17. Even as late as the seventy-ninth day of disease a patient's blood might remain infective, and be capable of infecting lice fed on such a patient while febrile.
18. The different varieties of trench fever resulted from differences in the persons infected rather than in the source of infection.

As the experiments had been but few, some of these findings might be modified by future work.

Major-General Sir W. G. MACPHERSON, D.D.G.M.S. France, speaking of experiments carried out in France, said that it had been found that the injection of blood from cases of trench fever produced the disease within one week, and the disease could be carried on through several cases. Lice infected from trench fever cases had been fastened on to the arms of men in such a way that the arm could not be scratched, and trench fever had been produced in these men in three weeks or longer. If clothes were placed in pits in which the temperature was raised to 50° to 70° C., the lice they contained were completely destroyed. Men of a platoon should be freed from lice simultaneously. Powders had proved very unsatisfactory.

Colonel Sir W. B. LEISHMAN, A.M.S., also spoke of the work carried on by the Trench Fever Committee in in France. The conclusions arrived at were similar to those of Major Byam. The incubation period in France in the case of inoculation directly from man to man was five to seven days. The period was longer when the blood was taken later in the disease or during relapses. In louse bite inoculation the incubation period was three times as long as in the case of blood inoculation. The organism was probably a protozoon, its cycle of development taking five to seven days. The virus was evidently present in the plasma, as the plasma experiments of the American party were positive in 100 per cent. of cases. This suggested that it was extra-corpuscular, and not connected with the blood cells. The mode of transmission was through the excrement, as shown by Major Byam, but late experiments in France appeared to prove

that infection could be caused from the bite of lice apart from excreta. Dried deposit from the urine of three trench fever cases had been rubbed into a scarified place on the arm, the patient developing trench fever in consequence.

Deputy Surgeon-General T. W. BASSETT-SMITH, C.B., R.N., said that the French had inoculated guinea-pigs with blood taken during the pyrexial period. A form of fever similar to that of trench fever was noticed, and spirochaetes had been found in blood taken from the heart during a period of slight rise of temperature. The spirochaetosis was allied to other forms; the immunity reaction was not the same as that of ictero-haemorrhagic fever.

Colonel G. SIMS WOODHEAD, R.A.M.C., asked how long the food material in the blood took to pass through the alimentary canal of the louse, and whether any experiments had been carried out by injecting bone marrow or fluids from it. The organism appeared to carry on its pathological work in the blood, bone marrow, spleen, and sheaths of blood vessels. There seemed to be evidence that the sympathetic system was especially involved, as evidenced by the vomiting, disordered action of the heart, and pyrexia. The myalgia appeared to be referred pain due to excitation of nerve cells in the spinal cord.

Captain ARNOLD RENSHAW, R.A.M.C., said that in twenty cases the bone marrow had been examined but no spirochaetes or any parasites had been found. The hole drilled in the bone marrow promptly relieved pain, which was probably due to pressure.

Major BYAM, in reply, said that food took about three hours to pass through the alimentary canal of the louse and was excreted at the next feed. Experiments showed that the poison appeared to affect the vagus system, and later the sympathetic system. "Referred pain" had been relieved by tapping the spine.

Reviews.

POLIOMYELITIS.

THE prevalence of acute poliomyelitis in America, and especially the great epidemic of 1916 in New York, has stimulated much investigation into the epidemiology and etiology of this disease. Flexner and Noguchi's description of globoid bodies as the causal factor was received with some doubt, and Rosenow and others argue in favour of a streptococcic origin. With this conflict of opinion in mind, it is interesting to compare the views expressed by RUHRÄH and MAYER[1] in their recent work on poliomyelitis in all its aspects with those of Draper of the Rockefeller Institute for Medical Research, whose monograph on the subject was reviewed in our issue of February 2nd, 1918 (p. 152). The two works were published almost simultaneously, and agree on the important etiological questions that the globoid bodies are the most probable causal factor, and that the disease is primarily a general infection which may, but often does not, attack the central nervous system. Ruhräh and Mayer make full use of the work of the Rockefeller Institute, and quote the results of the inquiry made into the epidemic of 1916. The object of the authors, indeed, has been to collect into one volume, from the enormous and ever-growing literature of the subject, the information they themselves wanted. In the chapter on the history of the disease the title-page and a number of figures from Jacob von Heine's monograph of 1840 are reproduced; the earliest mention of the disease as now understood is given from Underwood's *Diseases of Children* in 1784.

The authors adopt the classification of the scheme of the New York Health Department, distinguishing the abortive or non-paralytic, the rare ataxic group, the cortical, and the ordinary spinal form, the last including the meningitic, bulbar, bulbo-spinal, polyneuritic, and ascending varieties. The question of the relation of Landry's ascending paralysis to poliomyelitis is well considered; the conclusion reached is that most of the cases regarded as Landry's disease are poliomyelitis, although other conditions may possibly give rise to the same clinical picture. A special feature of this valuable handbook is the detailed account of the treatment, especially of the exercises; this part is successfully illustrated by numerous photographs. The authors have certainly produced a most useful work.

[1] *Poliomyelitis in all its Aspects.* By John Ruhräh, M.D., and Erwin E. Mayer, M.D. Philadelphia and New York: Lea and Febiger. 1917 (Med. 8vo, pp. viii + 297; 118 figures and 2 coloured plates. 3.25 dols.)

APPLIED BACTERIOLOGY.

DR. BROWNING and his collaborators of the Bland-Sutton Institute of Pathology have gathered a fund of useful and original information in the realms of present-day bacteriology within the pages of a small volume with the title *Applied Bacteriology*.[2] Perhaps the most important single subject dealt with is the brilliant-green-telluric-acid method for isolating organisms of the enterica group, a method resting upon a firm basis of experiment, and adopted with success by other bacteriologists. Dr. Browning quotes an instance in which this method yielded a pure culture of typhoid bacilli from a mixture of two typhoid bacilli with 2,800 other viable organisms. The brilliant-green inhibits the ordinary colon bacilli and the telluric acid the inosite-fermenting group of organisms, both of which are bugbears of the bacteriologist when making examinations for organisms of the enteric group. It is a pity that Ehrlich's rosindol reaction has not been more widely applied to save both time and expense in the differentiation of lactose non-fermenting organisms. It is, however, quite likely that the brilliant-green method is the best for its purpose; it has been worked out with meticulous accuracy by Dr. Browning and his collaborators. The Widal reaction after inoculation, upon which Mackie and H. G. Wiltshire did invaluable work, is relegated to a minor position in the recognition of enterica organisms, partly on the ground that inoculation agglutinins largely overshadow pathological agglutinins. The "absorption" method is recommended as being more accurate. Accurate measurement is preferred to Dreyer's method of counting drops, and the calibration of pipettes is carefully described.

Dr. J. F. Smith of Glasgow contributes two useful chapters, one on the bacteriological identification of diphtheria, and the other upon the uses of telluric acid in isolating diphtheroid germs and streptococci. The suppression of the *Bacillus pyocyaneus* and the *Urobacillus septicus* by thallium acetate is likewise a discovery of considerable practical value. The chapter on coloured antiseptics strikes new ground. Proflavine and acriflavine are held to be the most effective antiseptics *in the presence of serum*, and thus to be more powerful than the halogen group, such as chloramine-T. Their use is recommended both generally in sepsis and for turning the scale in early septic peritonitis. The Rideal-Walker antiseptic coefficient is deprecated on the valid ground that it holds good only for short periods of time. Ultra-violet radiation has not been found by Russ and others to possess a practical differential antiseptic value, as Dreyer formerly believed. The Abderhalden reaction in pregnancy is also discredited.

The antibody content of the blood, it is maintained, is not necessarily a gauge of the degree of immunity; this view is at first sight a trifle disconcerting, but it may conceivably be due rather to failure to detect the antibodies than to their absence. The specificity of antibodies of the colon group of organisms, a fact inferred by Emery and other workers in vaccine-therapy, is here established by the result of careful experiments.

The final chapter, on tetanus, contains much of clinical interest, and is very complete. The remainder of the book is purely bacteriological. We rather deplore Dr. Browning's poor opinion of the "crude mass of British (tetanus) statistics," amongst which, in point of fact, Golla's are a model of careful analysis. Dr. Browning wisely emphasizes the importance of giving antitetanic serum *intravenously* as well as intraspinally in early developed tetanus, the subcutaneous route being too slow in these cases to be effective. That certain horses may be "carriers" of tetanus is a fact which will be novel to many.

This book will be of great practical value to the bacteriologist, but is rather beyond most clinicians or administrators, to whom it is also inscribed. It is based upon a rich fund of well-digested facts.

[2] *Applied Bacteriology: Studies and Reviews of Some Present-day Problems for the Laboratory Worker, the Clinician, and the Administrator.* Edited by C. H. Browning, M.D., D.P.H., with contributions also by W. Gilmour, R. Gulbransen, T. J. Mackie, S. Russ, J. F. Smith, and L. H. D. Thornton. London: Henry Frowde, and Hodder and Stoughton. 1918. (Cr. 8vo, 491 pp.: 4 illustrations. 7s. 6d. net.)

RADIOGRAPHY OF THE SKULL.

IN his *X-Ray Atlas of the Skull*,[3] Dr. RUSSELL GREEN points out that bony landmarks are so numerous, and vary so much according to the angle at which a radiograph is taken, that the correct interpretation of skull radiographs is a very difficult matter. To overcome these difficulties of reading he has made radiographs of a dry skull from various angles, and has increased the opacity of certain parts by devices such as outlining sections with wire, covering structures with tinfoil, injecting sinuses with bismuth paste, and so on. Confining these processes to one side and then making a radiograph, the result affords a definite elucidation of the meaning and cause of the radiographic appearances.

The *Atlas* consists of a large number of very beautiful plates of these radiographs, showing on the one side the usual *x*-ray shadows and on the other side the various areas differently coloured. Across each coloured area is printed the name of the bone responsible for the shadow. Each plate shows also a photograph of the head, and of a skull, in the position in which the radiograph is taken.

The work is the result of the author's difficulties whilst attached as an *x*-ray expert to a large military hospital; and it was undertaken in order to make the localization of foreign bodies in and about the skull a certain and easy proceeding. He claims that the only additional apparatus required is a pair of compasses and a millimetre rule; and that, given good lateral and antero-posterior skiagrams, it is possible to give a definite opinion as to the relation of a foreign body to some salient bony point. In addition to a full description of each plate, the *Atlas* contains a short but concise description of the special radiographic apparatus required, and the author's method of marking the skin spots, as well as a table for reading off the distance of foreign bodies from the plates where a constant distance of 50 cm. from target to plate and a constant tube shift of 10 cm., are used.

Apart altogether from the mere localization of foreign bodies, the series of diagrams set out in this manner should be a valuable addition to the library of every expert *x*-ray worker, as affording an easy and rapid means of reading off the various shadows and areas in any given radiograph of a head.

"NEWEST TREATMENT."

THE *Handbook of Practical Treatment*,[4] described as a volume on "the newest treatment," is supplementary to the work which began to appear in 1911 under the guidance of the late Drs. J. H. MUSSER, sen., and A. O. J. KELLY, two enthusiastic physicians who unfortunately rest from their labours, though the editorial names remain the same. The reader is here presented with accounts of new developments in treatment since the original articles were written, and as a natural result some of the articles are quite short. Others, however, have been rewritten or are quite new, and special mention may be made of Surgeon-General W. C. Gorgas's contribution on yellow fever, Drs. R. Cole and Chickering's account of typhoid fever, Dr. T. Janeway's review of the modern treatment of diabetes, Dr. Rowntree's description of renal therapeutics, and of Dr. Homer F. Swift's account of auto-salvarsanized serum in cerebro-spinal syphilis. Drs. W. H. Park and C. Krumwiede, jun., have written a clear and sane article on vaccines and serums, and there is an admirable account of the specific therapy of pneumococcus infections by Dr. A. R. Dochez, dealing with antipneumococcus serum, the result of vaccines which he finds do not carry conviction, and ethylhydrocuprein, called optochin for short and trade purposes, which has an encouraging future but the drawback that it may cause temporary blindness and deafness. The only British contributors are the late Sir Lauder Brunton and Sir Clifford Allbutt, who from his ripe experience pleasantly discusses the present state of our knowledge about digitalis, summarizes his experience of the soldier's heart, and says of angina pectoris that, whatever view be taken of its nature, it should be treated on the lines of aortic aneurysm, by complete rest in bed for some weeks or months. In conclusion, it may confidently be said that this work fulfils its promise.

[3] *X-Ray Atlas of the Skull.* By A. Russell Green, M.B., B.S.Lond., M.R.C.S.Eng. London: Longmans, Green, and Co. 1918. (Med. 4to, pp. 37; 5 coloured plates. 10s. 6d. net.)

[4] *A Handbook of Practical Treatment.* By many writers. Edited by John H. Musser, jun., B.S., M.D., and Thomas C. Kelly, A.M., M.D. Vol. iv. Philadelphia and London: W. B. Saunders Co. 1917. (Roy. 8vo, pp. 1000. 30s. net.)

NOTES ON BOOKS.

WE have received the thirty-fourth issue of the *Year Book of the Scientific and Learned Societies*[5]—a most useful work of reference compiled from official sources. While a few scientific societies have been in abeyance during the past year of war, others have come into being, and the number of papers read fell little short of the average of recent years. As usual, a section is devoted to the principal medical societies. We cannot find any reference to the Medical Research Committee, though a list is given of the medical staff of the Local Government Board.

We have inadvertently omitted to mention that the sixteenth edition of Dr. HALE WHITE'S *Materia Medica*[6] has been published and has undergone various modifications to meet new conditions; in particular, it now contains an appendix setting out the various regulations affecting prescribing that have been issued as a result of the war, and attention is very emphatically drawn to the necessity of the reader making himself acquainted with them. The first edition appeared in 1892; the numerous editions that have been called for since then are convincing proof of the practical merits of the book.

Dr. LESLIE THORNE THORNE has issued a new, fifth, edition of his small handbook on *Nauheim Treatment in England*.[7] The text has been rewritten, and the book enlarged by the addition of chapters on arterio-sclerosis and high blood pressure, angina pectoris, heart strain, irritable heart and Graves's disease, and one or two other topics. The book is of a practical character, and includes descriptions of the exercises recommended as well as of the baths.

The pictures for Part II of *British Artists at the Front*[8] are provided by Sir John Lavery, A.R.A., and are chiefly concerned with the naval bases. They include striking sketches in colours of the shipyards and the big ships and the mine sweepers in harbour, but there are some notes of aerodromes and one of tanks in the making, all done with the artist's strong feeling for form.

[5] *Official Year Book of the Scientific and Learned Societies of Great Britain and Ireland.* Thirty-fourth annual issue. London: C. Griffin and Co., Ltd. 1917. (Demy 8vo, pp 342. 9s. net.)

[6] *Materia Medica: Pharmacy, Pharmacology, and Therapeutics.* Sixteenth edition. By W. Hale White, M.D.Lond., Lieut.-Colonel R.A.M.C.(T.). 1918. London: J. and A. Churchill. (Fcap. 8vo, pp. xii + 716. 7s. 6d.)

[7] *The "Nauheim" Treatment, in England, of Diseases of the Heart and Circulation.* Fifth edition. By Leslie Thorne Thorne, M.D. 1918. London: Baillière, Tindall, and Cox. (Cr. 8vo, pp. vii + 160; 92 figures. 5s.)

[8] London: *Country Life*, Ltd. 1918. 5s. net.

BRITISH EQUIVALENTS FOR GERMAN MEDICAL SUPPLIES.

I.

THE outbreak of war stopped the ordinary sources of supply of some of the material and appliances used in medicine. The principal disturbance was among the synthetic products derived directly or indirectly from coal-tar. Before the war what are termed "fine" chemicals were largely of German origin, "heavy" chemicals were largely British, though not to the same preponderating extent. Whatever shortage has arisen in "heavy" chemicals has been due principally to Government demands, not to the lack of normally sufficient supplies. In soda salts, for example, which are products of the "heavy" chemical trade, there has been nothing like famine. So far as "fine" chemicals are concerned, the German share in the preparations used in medicine amounted almost to a monopoly, as it did also in photographic developing agents and in many dyes. Even such substances as iron salts, iodine, and cyanide were supplied in part by Continental houses, but in the case of these articles after the outbreak of war the British manufacturers were able to meet demands from their own resources. It was different with some of the very complex compounds. A few synthetic drugs, such as chlorbutol, had been made by British houses in pre-war days, and France produced synthetic adrenalin, but among the more important drugs which were, we believe, not manufactured in this country were antipyrin, aspirin, salicylic acid, phenacetin, chloral hydrate, phenolphthalein, saccharin,

veronal, sulphonal, trional, encaine, and novocain, together, of course, with the salvarsan compounds. Most of these were exclusively made in Germany, and the value of the imports of these products was placed at over a million a year. With regard to other pharmaceutical preparations the case was less difficult. For some years opium alkaloids and quinine, and more recently caffeine, strychnine, and emetine, had been produced in this country, some of them on a large scale, even for export purposes, and others, like cocaine and theobromine, in small aggregates; altogether a good many compounds were available. Germany, however, was a larger manufacturer of all these bases except morphine, and it was in Germany that many of the rarer alkaloids were prepared. Atropine, homatropine, and eserine were probably exclusively German.

Under the stimulus of war many British firms started experiments and produced chemicals and galenicals to replace German-made preparations, until, first in respect to one class of products and then to another, the country became self-supporting. A start was made on salicylic acid and its compounds, and one firm was manufacturing salicylic acid early in 1915, and by the middle of 1916 a sufficient supply of salicylates and acetyl-salicylates was assured. This was followed by work on atropine sulphate, which now figures in the manufacturing list of more than one British firm. Among articles previously wholly or mainly of German origin but now produced in this country are absolute alcohol, butyl-chloral hydrate, paraldehyde, lactic acid, homatropine, phenacetin, saccharin, salol, tribromophenol bismuth (xeroform), potassium permanganate, novocain, and salvarsan. A British fine chemical industry has been established, and medicinal products of purely British manufacture now have a wide range, and cover organic antiseptics, antipyretics, sedatives, local anaesthetics, and diuretics. Many of these preparations are not substitutes for the German products if the word "substitute" denotes something different and possibly inferior; they are identical in chemical constitution, and are utilizable for the most part in the same manner and in the same dosage as the products they displace. In some cases they are even better than the original because the standardization is higher; this is true more particularly of the alkaloidal productions. To duplicate the extremely efficient German drug industry is no small achievement, amid all the embarrassments of war conditions, for it has to be remembered that many of the preparations depend upon the by-products and intermediate products of other chemical processes. The achievement was only possible because British manufacturing chemists had been accumulating experience before the war, familiarizing themselves with laboratory equipment, and accustoming their minds to the habit of research. The scientific foundations were already laid, and when the emergency arose the commercial superstructure was quickly added.

The value of this preliminary work was to be proved when, on the stoppage of the German supplies of salvarsan, a licence was granted by the Board of Trade to Burroughs, Wellcome, and Company for the manufacture in this country of these preparations under the name of "kharsivan" and "neokharsivan," and to Poulenc Frères, of Paris, for the sale in Great Britain (through the agency of May and Baker, Limited, of London) of the same products under the name of "arsenobenzol-billon" and "nov-arsenobenzol-billon." In spite of their distinguishing trade names, these products are chemically identical with salvarsan and neo-salvarsan. The licence granted by the Board of Trade was subject to the condition that all samples of the drugs should be submitted to biological tests by an authority approved by the Board; the policy of the Medical Research Committee, the authority chosen, was outlined in the BRITISH MEDICAL JOURNAL of April 10th, 1915 (p. 649), and records of experience in the practical application of the new equivalents have been given in later issues.

In addition to these products, Burroughs, Wellcome, and Company have prepared antifebrin, which was the first of the antipyretic drugs to be discovered in Germany thirty years ago, hexamine, phenacetin, beta-eucaine hydrochloride, and various glycerophosphates, also salts of atropine, cocaine, hyoscyamine, hyoscine, homatropine, eserine, pilocarpine, and tropacocaine, all of them previously obtainable chiefly or entirely from Germany. A further achievement has been the elucidation of the chemistry of the alkaloids of ipecacuanha. The constitutional relationship between emetine and cephaeline has been investigated in the firm's experimental laboratories, and the synthesis of emetine is the direct result. This firm has a materia medica farm at Dartford which seems likely to have an important influence upon the creation of a standard herb supply. Here not only are aconite, belladonna, digitalis, and hyoscyamus grown on a large scale, but experiments with plants other than indigenous are being carried out. It is commonly supposed that the soil and climate of Britain are unsuitable for alkaloid-yielding plants. The difficulty has probably been over-estimated, but in any case, with the resources of the British Empire to fall back upon, there seems no reason why we should not be pharmaceutically self-supporting, and independent of the German syndicates which, while deriving few medicinal plants from their own country, controlled drug supplies grown in various parts of the world. The *Hyoscyamus muticus* of India and Egypt is said to yield 1 per cent. of alkaloid, and the sufficient importation of this plant should be of assistance.

Three interesting products in definite substitution for similar articles previously obtained from Germany have been brought out by Allen and Hanburys. The first of these is thiosinamin salicylate, under the trade name of salicylysin, which is made up for hypodermic injection, and is similar to Merck's fibrolysin. Another of the equivalents brought out by this firm is designed to take the place of bromural. It is brom-iso-valeryl-urea, commercially named dormigene, containing 35.9 per cent. of bromine. Allen and Hanburys have also produced a bacteriological peptone to take the place of Witte's peptone. This product, called eupepton, is a fine, buff-coloured powder, almost odourless, and in the opinion of bacteriologists is equal to the peptone formerly supplied from German sources for the preparation of a nutritive medium. Another manufacturing chemist who has been successful in preparing various equivalent preparations is Dr. W. Martindale of New Cavendish Street, London. Upon his list are chloralamide, bromine, and iodine compounds of albumin, benzonaphthol, and sodium barbiturate (the equivalent of sodium veronal); latterly it has become a question of making organic chemicals directly or indirectly required for war purposes, and among these he names dimethylglyoxine, benzidine, thiosinamin, tribromophenol bismuth, emetine bismuth iodide, phenolsulphone-phthalein, and others. Along a different line of investigation Dr. Martindale also deserves some credit for introducing a modest industry by the production of compressed moss in sheet form. After twelve months' work in the experimental stages he was able to secure this absorbent dressing, which is specially valuable in view of the shortage of cotton and gauze, in a form equal to, if not better than, the German article, and entirely obtained from British-grown moss.

We cannot attempt to enumerate all the fine chemicals which have issued from British works laboratories during war years. Burgoyne, Burbidges and Company of East Ham have now a list of thirty-four medicinal products which they are manufacturing. These include hexamine (urotropine), calcium lactate, anethol, eucalyptol, cocaine nitrate, and a number of acids and salicylates previously obtained from Germany. A similarly lengthy list, the principal items of which are again hexamine and calcium lactate, and phenacetin, aspirin, and lanoline, as well as salvarsan and neo-salvarsan, is that of Evans, Sons, Lescher and Webb, Limited, of Liverpool.

(*To be continued.*)

DR. W. HIRSCHLOFF, speaking at a medical meeting at Königsberg, said that the blood pressure was raised after a flight, particularly in men over 30. The amount of haemoglobin and the number of the red cells were invariably found to be increased in men who had been flying for some time. The lymphocytes also were more numerous. Flying provoked no organic changes in the heart other than those associated with athlete's heart. Another speaker suggested that the reason why mountain climbing might induce certain symptoms at an altitude of only 3,000 metres, whereas the airman did not suffer till he had reached a considerably greater altitude, was that the airman had not exerted himself much in getting to this height.

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SATURDAY, MAY 25TH, 1918.

PRECAUTIONS AGAINST THE SPREAD OF MALARIA.

IT is very well known that malaria used to be endemic in certain parts of England, and although the general belief is that it died out at some time during the last century, it has never been conclusively proved that it might not persist on a very small scale in certain particularly favourable areas. Some seventeen years ago Nuttall, Cobbett and Strangeways, in the course of a survey of certain parts of England, not only found *Anopheles* in districts where ague formerly prevailed, but also in parts as to which they could obtain no record of the disease at any time in the past. They concluded that the occurrence of ague was not so much a matter of the geographical distribution of *Anopheles* as of the numbers present in a district. They attributed the occasional occurrence of ague in certain districts to infection of *Anopheles* by a malarious subject coming from some other country. From that time until military operations took British forces into the near and middle East nothing occurred to direct attention to the subject. Since then it has become necessary for the authorities in England, and also in France, to give attention to the risk of the re-establishment of endemic foci.

Towards the end of 1916 the return of many men invalided with malaria led Sir Alfred Keogh to take steps to obviate the risk, and as a result of conferences with experts it was decided to concentrate soldiers infected with malaria at special malaria hospitals in the United Kingdom. A little more than a year ago Mr. Macpherson was able to state in the House of Commons that centres for the treatment of malaria had then been established in each command, or eight in all, and that officers with experience of the disease had been placed in charge of them. It was anticipated that in spite of all precautions indigenous cases might arise, and this happened in England during the summer of last year, a small number being reported both among the troops and the civil population in the south, but especially in the south-east of the country.

In view of these facts the Army Medical Department communicated with the Local Government Board, and subsequent inquiries have been carried out jointly by the two departments. Preliminary communications were addressed to medical officers of health, and inspections were made. General instructions for the treatment of malaria cases, both in hospital and outside, were issued by the War Office; they were to the effect that all men infected with malaria should be given 60 grains of quinine weekly, and should be provided with bottles of quinine tablets to carry about with them, partly in the hope of preventing relapses, and partly to prevent the spread of the disease from malaria carriers to healthy persons. Soldiers suffering from malaria in places where mosquitos abounded, if they could not be sent to special malaria hospitals or otherwise removed from the district, were collected in huts protected against the entry of the insects. In the malaria hospitals cases were similarly protected when this was considered necessary, the opinion being that protection from mosquito bites, together with persistent dosing with quinine, would suffice to check the spread of malaria from the military cases in such localities. In addition much work was done in the way of clearing and oiling pools and watercourses. Recent surveys have shown that *Anopheles* occur in small numbers during the summer all through the United Kingdom, but probably, it is considered, usually in such small numbers as to reduce the danger of the spread of malaria to an almost negligible quantity.

Early this year further conferences were held; a new memorandum was issued by the War Office, and several officers, including Captains A. Macdonald, O'Connor, and Parsons, R.A.M.C., and Lieutenant Edwardes, have been put on special duty to visit the most dangerous areas in order to supervise the military measures which have been taken, and to give expert advice and assistance. The Local Government Board has taken steps to ensure that malaria is made notifiable in localities known to be, or thought likely to become, infected. The army has in force a general system for the immediate notification of cases of malaria coming into the United Kingdom from abroad, and records are kept of the ports where such cases disembark and the places to which they go on leave or are stationed when on duty or in hospitals. The civil medical officer of health in an area specially affected can thus be informed when such a case enters his district in order that its subsequent course may be watched. Regular monthly reports sent in by medical officers of all units and military hospitals are collected, tabulated, and studied. The organization now set up provides for the close supervision of all former foci of malaria in England, and if new foci are discovered machinery adequate to deal with the matter is available. In all this the War Office is working with the Local Government Board; the Board's medical department now includes two inspectors who formerly had wide experience of malaria in India—Lieut.-Colonel S. P. James, I.M.S., and Lieut.-Colonel Wilkinson, I.M.S. They are available to give advice on the measures required by the civil authorities.

So far this year no new cases of indigenous malaria have been reported. We understand that the Local Government Board has in preparation a memorandum on the whole subject and that its publication may be expected within the next few weeks.

TUBERCULOSIS OFFICERS AND THEIR WORK.

THE national determination to overcome one great evil in the shape of autocracy and military domination has not had any serious effect upon the other national effort to suppress the unseen but equally deadly evil known as tuberculosis. The army of tuberculosis officers with their assistants of both sexes obtain no mention in the newspapers, and the results of their work can only be judged by the official reports issued for the information of the councils or other bodies by whom they are employed. No great victories can be recorded, but the gradual spread of knowledge and experience into the homes of those who are the unconscious centres of infection, and the gradual weeding out of the dangerous elements, cannot fail to be exercising an influence for good over a very wide area. In most of their reports the tuberculosis officers, especially those working in large towns,

point out the need for closer co-operation between the panel doctors and the tuberculosis centres.

In his report for the borough of Wigan the tuberculosis officer calls attention to the undoubted fact that cases of anaemia, indigestion, wasting and general asthenia are too often glossed over by a soothing diagnosis, although tuberculous in origin. He makes the suggestion that all cases so certified for insurance purposes should be examined at stated intervals at the tuberculosis centre, if certificates are frequently renewed. By such means the true condition might be detected and the high percentage of cases seen for the first time with advanced disease correspondingly lowered. The induction of artificial pneumothorax has been found to be of remarkable value in a few suitable cases without widespread adhesions, and relief has been given which could not have been attained by any other known means. Instances of this are recorded by the tuberculosis officer for the Soke of Peterborough. The results, however, are often disappointing owing to the extreme difficulty of diagnosis of the exact conditions within the thoracic cavity. Even with the best assistance of *x* rays it has not been found possible to avoid occasional mishaps.

The important question of dealing with tuberculous or suspected children in schools is discussed at length in the March number of the municipal report of the Tuberculosis Sanatorium in Chicago, a city in which the whole subject has been attacked very vigorously. Systematic examination has detected a very considerable undercurrent of the disease in family life, wholly unsuspected by the victims and their friends. The assembling of suspected children at a tuberculosis centre, where they are of necessity brought into contact with actual sufferers, is properly deprecated and a system of regular school inspection by tuberculosis officers advocated. Parents do not raise objections to such inspection, which would appear on all grounds to be the more satisfactory proceeding and can be maintained as part of the regular school routine.

Apart from these special points, it must be noted that the same complaint is traceable throughout all the official reports—namely, that notification is too often delayed until the curative stage has been passed. One reason for this delay is to be found in the mistaken idea that a positive diagnosis is not warranted until bacilli appear in the sputum. Much subsequent misery is caused by lack of courage to face unpleasant facts, and if the individual alone were to be regarded he might well be left to take the consequences of his cowardice; but in the case of tuberculosis the interests of the individual must give place to those of the community in which he lives, and his medical adviser, whether he be acting in a private or a panel capacity, should refuse to aid in the suppression of the truth.

THE CONTROL OF THE MEDICAL SERVICE OF THE ARMY.

ONE of the curious anomalies produced by the war is the fact that for the past three and a half years the control of the Army Medical Service as a whole, except in France, has been in the hands of an officer who throughout has been "acting." The reason is that Lieut.-General Sir Arthur Sloggett, the official chief of the service, who took up office as Director-General A.M.S. on June 1st, 1914, has since October, 1914, been abroad in immediate command of the medical affairs of the British armies in France. The regulation term of office for the Director-General of the Army Medical Service is four years, but it has been not uncommon to extend the term by a further year, and within the next week or two we shall know whether this practice is to be followed on the present occasion or whether the present acting officer, Lieut.-General Goodwin, is to be confirmed forthwith in his appointment as Director-General A.M.S. In either case, however, no change in the directorate of medical affairs in France need necessarily ensue. Sir Arthur Sloggett, we imagine, is far too keen a soldier to desire to lay down his responsibilities until the war is over, and we do not anticipate that the Army Council will invite him to do so, for Sir Arthur Sloggett is one of the Generals who have not only made good, but more than good; his administration, in short, has been characterized throughout by a high level not only of foresight, but also of adaptability to the varying circumstances of the war. Of this point the latest news we have heard from France serves as an apt illustration. An advisory body to control and direct medical research has been created. Progress in medical affairs has all along been rapid in the British army in France, because the desirability of taking full advantage of civilian experience has been thoroughly recognized, and the British medical authorities in that scene of war have made it their duty to see that scientific ambitions shall not be checked more than military needs render absolutely necessary. As a result, an increasing number of medical officers have felt encouraged to endeavour to solve the problems presented by wound treatment and disease prevention, and consequently the number of research centres that have arisen in France has little by little become quite large. In some instances their work has overlapped; in some, owing to ignorance of what others are doing, workers have gone over ground already explored; and in others rival projects for research have been put forward. It is to remedy these drawbacks that Sir Arthur Sloggett has created the new council, which will not, however, lessen the responsibilities or importance of the council whose institution by him early in the war we mentioned at the time. That body deals with any questions on which the D.G.M.S. British Armies in France, thinks it desirable to seek the considered opinion of a body consisting in equal numbers of men whose experience has been mainly civilian and of men whose experience has been mainly military. The new body will deal solely with the co-ordination and control of medical research. Its creation appears to us to be a further example of Sir Arthur Sloggett's happy capacity for seizing on the nodal point of any of the multiple problems that present themselves when a huge number of professional men are suddenly turned on to work which is familiar to them in many aspects but new to them in others. It is a capacity which in Sir Arthur Sloggett's case is combined with a talent of almost greater value—namely, that of making men see things from other peoples' points of view, and thus securing cohesion and loyal co-operation between hundreds of men all very differently trained, and all entitled in civil life in various parts of the world to consider themselves leaders and experts. The net result of the two capacities is that not only has the professional work in France been done on thoroughly scientific lines, greatly to the benefit of the British soldier and of the repute abroad of British medicine, but it has also been done by men who, for the most part, are satisfied with their lot, so far as any man can be satisfied so long as the persistence of war necessitates separation from his family and his private interests. These are among the reasons which enable us to look at the position of medical affairs in France with much satisfaction, whether we regard them from the point of view of parents and relatives of the British soldier, or from the point of view of the medical profession. They are also among the reasons why both parties would, we believe, not only regret any change in the directorship of medical affairs in that country, but very definitely resent it, unless brought about by absolutely unavoidable circumstances.

THE LIQUOR CONTROL BOARD.

THE fourth report of the Central Control Board (Liquor Traffic) deals with the year ending March, 1918. About nineteen-twentieths of the population of Great Britain live in areas covered by the Board's orders. The restrictions upon the output of liquor are imposed by the Food Controller, and during the year under review the amount of alcohol allowed to be sold was 50 per cent. less than in the previous year, but owing to the progressive dilution of spirits and the decline in beer gravities the bulk supply did not decrease proportionately, the reduction in the case of beer being under 30 per cent. In the areas affected by the Control Board's regulations the convictions for drunkenness have fallen to little more than a fourth of the figures for 1913; the reduction in the case of males was from 89,915 in 1913 to 20,801 in 1917, and among females from 28,352 to 9,415. It is thought that the convictions might have been fewer but for the fact that in some localities the supply of alcoholic beverages has been uneven, so that queues and what is called "rush" drinking, with their attendant evils, have tended to alternate with periods during which alcoholic beverages could not be obtained. The Control Board hopes that the methods that have now been put in force, with the co-operation of representatives of the licensed trade, will ensure a more even distribution. The decline in convictions was rapid down to the end of 1916 and continued during the earlier months of 1917 with no great diminution in rate; since then there has been a further improvement, which, though very slow and slight and not quite general, would appear to be still in progress. Contemporaneously there has been a notable fall in the number of deaths due to or connected with alcoholism; the number of deaths attributed to cirrhosis of the liver declined from 2,215 males and 1,665 females in 1913 to 358 males and 222 females in 1917. At the same time the deaths from alcoholic diseases other than cirrhosis fell from 1,112 males and 719 females to 358 males and 222 females. The number of cases of suffocation of infants by overlying, which have been shown to have some association with indulgence in alcohol, also declined, from 1,226 in 1913 to 704 in 1917. Cases of attempted suicide also show a notable decline, but, as was pointed out in a note on the Registrar-General's last report, published in our columns on May 4th, it is probable that the causes of this decline are complex, and that it cannot be attributed directly to decrease in drinking. The constructive part of the Board's work has made considerable progress. The number of industrial canteens has risen from 570 in 1916–17 to 780 in 1917–18, the total number of persons catered for being nearly a million. The allowances from the earnings of controlled establishments which the Board has undertaken to recommend in respect of the provision of canteens amount to over a million and a half sterling. Full financial details of the trading are not yet available, but it is estimated that after meeting all the usual trading charges—that is, after providing for rents, repairs, licence duty, rates and taxes, managerial and architectural staff, and depreciation on plant, furnishings, and utensils, the annual return on the capital commitments of the Board in its direct control undertakings has been at the rate of about 15 per cent. This, however, is a subsidiary matter, for the Board's primary object is not to make a pecuniary profit, but to control the liquor traffic as part of an effort towards the successful prosecution of the war. The reduction in drunkenness and its effects has been so considerable that there is now only a relatively small margin for further improvement. In conclusion the Board points out that whether the improvement that has been achieved shall prove permanent or temporary depends on unknown factors, particularly on future legislation and administration. The Board's experience, however, suggests that there is no such inherent difficulty in the problem as to render impossible the permanent maintenance of the present level of sobriety.

POST-GRADUATE TEACHING IN NEUROLOGY.

THE establishment of neurological hospitals throughout the country for the treatment of soldiers suffering from shell shock and war neuroses is an important step in reconstruction, for it is recognized that a large number of soldiers who are incapacitated by war neuroses can be cured by suitable treatment. The essential condition for treatment is correct diagnosis. The earlier the treatment of these functional neuroses, especially of the hysterical manifestations, is undertaken the easier is a cure effected. It has been calculated that the disorders of one-third of the whole of the unwounded soldiers discharged from the army belong to the group of functional neuroses. Hitherto men presenting hysterical contractures and paralyses of the most varied kind have been discharged and are receiving pensions, and unless something is done to prevent this a great and unnecessary waste of power and expenditure of public money will occur, for the longer these functional disabilities are permitted to remain the less curable they become. Dr. Addison, the Minister of Reconstruction, is fully alive to the importance of this matter, and recognizes that it is not only doctors serving in the army who are likely to have the care and treatment of these cases in the neurological hospitals, and who, in the interest of the state, require instruction in the methods of diagnosis and treatment, but also civilian medical men, especially panel doctors, among whose patients there will be for years to come large numbers of soldiers suffering with uncured neuroses or relapses brought on by emotional shock of a varied kind, even such as domestic and financial worries. The war indeed will leave for a considerable time a widespread emotivity in the population, which, unless care is taken, will be fostered by misplaced sympathy and reinforced by the idea of a pension for life. For this reason, Lieut.-Colonel Mott, after a consultation with Dr. Addison and the Director-General A.M.S., proposes to institute at the Maudsley Hospital a course of instruction to a limited number of civilian doctors and temporary R.A.M.C. officers interested in war neuroses and shell shock. The course will consist of lectures and practical instruction in the causation, diagnosis, prognosis, and treatment of functional diseases of the nervous system due to the war. Members joining the course will be afforded the opportunity of examining cases, writing reports thereon, and treating them under the direction of Lieut.-Colonel Mott or officers associated with him. Application to attend the course should be made to Brevet Lieut.-Colonel F. W. Mott, Maudsley Neurological Clearing Hospital, Denmark Hill, S.E.5. Fuller details will be decided later after a consultation with those wishing to attend the first course of instruction.

FACTORS IN RESISTANCE TO TUBERCULOSIS.

UNTIL recently the idea that resistance to infection need not entirely depend on specific immune bodies was largely ignored in experimental work, but certain investigators now believe that tuberculin has no special significance, and its beneficial effects no relation to active immunization, that the actual demonstration of an increase in antibody concentration in tuberculosis is not necessarily associated with favourable clinical results, and that recovery does not depend on the presence of specific antibodies. One of the factors influencing the resistance to tuberculosis, and bearing on treatment, is the ferment-antiferment content of the blood, and this new and rather intricate subject is considered in an interesting manner by Petersen.[1] The caseation in tuberculous formations is due to the inhibition of autolysis, which normally occurs in inflammatory products, by the unsaturated lipoids derived from the tubercle bacilli. These lipoids act as antiferments, and if they are removed or saturated with iodine the caseous material can be digested by trypsin. The

[1] W. F. Petersen, *Arch. Int. Med.*, Chicago, 1918, xxi, 14–38.

absorption of caseous material is thus prevented by antiferment action, but if the antiferments are diminished locally, or the ferments increased in the blood serum, autolysis occurs, and toxic bodies pass into the circulation. In pregnancy the lipoids of the blood and the antiferment content increase; the ferments also increase, but to a greater degree, and therefore begin slowly to digest the fibrous capsule of tuberculous foci, and so to liberate toxic bodies; but the patient feels well. At delivery the antiferments rapidly diminish, but the ferment content remains high, so that rapid digestion of the fibrous tissue around tuberculous material occurs, with liberation of toxic bodies and bacilli, thus favouring the spread of the disease. This corresponds with the clinical course of tuberculosis in connexion with pregnancy. In menstruation the proteolytic ferments of the blood increase, and in tuberculous women fever about the menstrual period may be explained as due to digestion of the fibrous capsule around caseous foci and passage of toxins into the blood. Thus, in pregnancy and the menstrual cycle, the activation of latent foci and the temperature changes do not bear any relation to antibody reactions. Tuberculin is not a native protein, but largely a mixture of polypeptides with a toxic action, and Petersen suggests that a subcutaneous injection of tuberculin damages some of the cells and thus raises the ferment content of the blood so that digestion of a tuberculous focus, if present, occurs and liberates some toxic bodies; in a non-tuberculous person nothing happens because there is no focus to be affected. Changes in the ferment-antiferment content of the blood may be produced by the injection of various vaccines and foreign proteins, and it therefore appears that the general reaction to tuberculin is not, strictly speaking, specific, though the cutaneous reaction is related to a definite sensitization. Any good done by tuberculin treatment is not due to an increase in antibodies but to a non-specific action—namely, alteration of the ferment-antiferment balance in the blood serum as in protein shock therapy. Although clinical experience shows that small doses of tuberculin are advisable, there is some evidence that occasional larger doses, with constitutional effects, may in certain instances be of greater benefit than the continued use of the minute doses commonly employed. It is interesting to note that the highly unsaturated fish oils, milk, cream, yolk of eggs, and phosphorus, empirically given in tuberculosis, increase the antiferment content of the blood, and so would inhibit proteolysis of the fibrous tissue surrounding tuberculous foci.

ANTIMENINGOCOCCIC SERUM IN CEREBRO-SPINAL FEVER.

In an epidemic of 208 cases at Camp Jackson, South Carolina, Dr. Herrick,[1] acting on the generally accepted view that at first cerebro-spinal fever is a septicaemia, has on logical grounds gradually evolved the treatment by large intravenous injections (200–600 c.cm.), combined with free drainage and relatively small intrathecal injections of serum. The existence of the pre-meningitic stage of systemic infection lasting from a few hours to three days could be made out clinically in about half the cases. This modification of the treatment aims at the sterilization of the patient's blood before the meninges have become affected, and is thus an advance on the usual methods which have been concentrated on the later stage of meningitis, when, as Flexner insisted, subcutaneous and intravenous injection of serum have very little influence as compared with the intrathecal method. No bad effects were noticed from the large quantities of serum employed, indeed, a suspicion was aroused that small doses did some harm, and certainly the results were not so good as with large quantities. Mild cases of the disease do equally well with either intravenous or intrathecal injections of serum; thus, of 36 cases by intrathecal injection one only proved fatal, but the intravenous injection of large quantities of serum reduced the mortality of the severe cases from 62 to 19 per cent. Among 16 cases of various degrees of severity treated by small intravenous (under 50 c.cm.) and intrathecal injections the mortality was 43.2 per cent., whereas among 79 similar cases given large intravenous injections and average or smaller intrathecal injections the mortality fell to 16.4 per cent. Of the four clinical groups of cases—the abortive, the ordinary, the severe, and the fulminating—the most brilliant results were obtained in the severe cases; the patients often came rapidly out of coma with such remarkable recession of the symptoms that they were free from danger in two days, and anxious to be up on the fourth day. As a result of the treatment the patients have the cheerful optimistic air common in a convalescent surgical ward, subacute and chronic cases with cachexia, delirium, and other distressing symptoms are rare, the duration of the disease is shortened, the complications diminished, and the mortality lowered. In connexion with the free spinal drainage, which formed part of the treatment, attention should be directed to Cobb's method of obtaining a flow of cerebro-spinal fluid when lumbar puncture brings away a few drops only and the foramina may be obstructed. Under chloroform narcosis, which obviates muscular rigidity, the head is manipulated in order to break down adhesions about the foramen magnum and the floor of the fourth ventricle. This method, which might suggest danger from traction on the vagus roots, was often successful in starting a flow of cerebro-spinal fluid, and in one instance restored respiration after it had failed.

[1] W. W. Herrick, *Arch. Int. Med.*, Chicago, 1918, xxi, 541–563.

HORSE-FLESH AS HUMAN FOOD.

As every one's attention is now necessarily drawn to questions of food, and as criticisms on the rations naturally follow, perhaps raising the suspicion that the meat is the flesh of the horse, the issue of Dr. Leo Price's pamphlet[1] on the subject is appropriate. Horse-flesh was used as food by the early cave men in Northern Europe, and widely and extensively since in various parts of the world. Statistics for Great Britain are not available, but in 1910 Paris and its environs consumed twenty-nine million pounds of horse-flesh, and in 1909 over 150,000 horses and nearly 7,000 dogs were slaughtered in Germany for food. The prohibition by the Mosaic law, and by the papal decrees in the seventh and eighth centuries, together with sentimental feeling, is probably responsible for the prejudice against the use of horse-flesh as human food; but it is wholesome, nutritious, and economical. Deep red in colour, bordering almost on brown or black, horse-flesh shows a bluish sheen on exposure to the air, and when refrigerated turns black after fifteen days. One of its qualities is a slight sweet taste, but toughness is not a necessary characteristic any more than of any other meat. It contains a relatively large amount of glycogen; taurine is said to be present, and the fat is peculiar in its high content of olein and its very low melting point. When used exclusively, horse-meat may cause diarrhoea from the presence of a substance, soluble in alcohol, consisting of 75 per cent. lecithin and 25 per cent. neutral fat and cholesterol, and removed in the meat broth when the horse-flesh is cooked. By acting on this the diarrhoea can be avoided. It has been recommended that it should always be boiled or roasted. In comparison with the meat of cattle and pigs, horse-flesh is a negative factor in causing tuberculosis, and there are no parasites in horse-flesh transmissible to man; but every precaution should be taken to eliminate glanders in horses offered for food, and it should be sold under special regulations so as to prevent substitution and adulteration.

[1] *Journ. Amer. Veterinary Med. Assoc.*, August, 1917. Reprint Series, No. 6, January, 1918.

MEDICAL INSURANCE AGENCY.

AT a meeting of the Committee of the Medical Insurance Agency, on May 9th, Dr. G. E. Haslip, who was in the chair, referred with deep regret to the death of Mr. Guy Elliston, agent and secretary since the Committee was formed, to whose energy and good judgement so much of its success has been due. It was resolved to forward a letter of sympathy to his family. The chairman, in presenting the balance sheet for 1917, said that in spite of the fact that the country was now in the fourth year of the war the Agency had maintained its business all round and had been able to allocate the substantial sum of £1,000 to medical charities, the largest amount distributed in any one year since the Agency was founded. In addition the policy holders had benefited to the amount of £717, so that the total amount by which the profession had benefited through the Agency in 1917 was £1,717. There had been an increase in life and accident business, and even in respect of motor car policies the shrinkage in revenue had been exceedingly small. The Committee resolved to make an interim distribution for 1918 to medical charities of £500; it was allocated as follows: the Royal Medical Benevolent Fund, the War Emergency Fund, Royal Medical Benevolent Fund Guild, and the Belgian Doctors' and Pharmacists' Relief Fund, to each £100; Epsom College Benevolent Fund and Royal St. Anne's School for Girls, to each £50. As a result of this additional distribution the total sums allocated to medical charities by the Agency since its foundation have reached £3,905. It was resolved again to call the attention of the Royal Medical Benevolent Fund and Epsom College to the hope of the Committee that the two institutions should come to satisfactory arrangements with regard to settling any differences of opinion that might arise with regard to testamentary benefactions not clearly defined.

INFANT WELFARE IN GERMANY.

THE Local Government Board has issued a report[1] on infant welfare in Germany during the war, prepared by the Board's Intelligence Department. Information is given as to the birth and death rates, the special maternity grants which have been provided, and the other measures for saving the lives and improving the health of infants. The most striking fact is the heavy fall in the number of births. The first three years of the war reduced by over two million the number of babies who might have been born had peace prevailed. In 1916 the total number of births was 40 per cent. less than in 1913. In the months immediately following the outbreak of war there was a sudden rise in the infantile death-rate, but this has since been kept well down, at its worst it was never so high as in the very hot and dry months of 1911. The most noteworthy measures taken for infant welfare are the special grants to women who give birth to children. One of the grants is given only to those who breast-feed their babies. They are administered largely through the insurance societies, but the best opinion is in favour of administration through infant welfare centres, of which the numbers have increased since the war. Local authorities have been active in taking steps to overcome the difficulties of making proper provision of food for expectant and nursing mothers, and for infants and children. In contrast to this country, the infantile death-rate in Germany is higher in the rural districts than in the towns, and the improvements in infant welfare in Germany during the war have been effected principally in urban centres. Looking at the actual results of their well-advertised schemes and plans, we find the Germans still far behind our own country. Thus our infant death-rate is some 50 per cent. lower than that of Germany. The report is mainly based on information published in German journals devoted to infant welfare, local government, medicine, and social reform; it will repay careful study.

[1] H.M. Stationery Office. 6d. net.

THE Minister of Munitions has appointed a committee to advise him upon the general principles to be adopted in carrying out the welfare and health work of the Ministry, and to report on all matters connected therewith that may be referred to them. The committee is a mixed one, containing representatives of various interests, and the chairman is Mrs. H. J. Tennant. The medical members are Sir Walter M. Fletcher, K.B.E., M.D., F.R.S., secretary of the Medical Research Committee; Dr. E. L. Collis, Director of Welfare and Health Section, Ministry of Munitions; and Dr. T. M. Legge, medical inspector, Factory Department, Home Office.

Medical Notes in Parliament.

State Medical Service and the Proposed Ministry of Health.—Mr. Booth asked Dr. Addison upon what ground the question of a state medical service was regarded as a forbidden subject in considering a Ministry of Health; and whether he was aware that many of the workers under the Insurance Acts were desirous of having the proposal thoroughly examined with a view to remedying some large and serious evils. Dr. Addison replied: The negotiations to which the hon. member refers were limited to the discussion of the redistribution of the functions of central departments in relation to health services. As stated in reply to a similar question on April 22nd, the question of a state medical service would not therefore have been relevant to the proceedings. In reply to a further question, Dr. Addison said that the negotiations with the various interests as to the Ministry of Health had been completed, and there was no disposition on the part of those concerned to suggest that personal claims entered into the important matters under consideration.

Royal Air Force Medical Committee.—Major Baird (Under Secretary to the Air Ministry) stated, in reply to Sir H. Greenwood on May 15th, that the Medical Administrative Committee of the Air Force had met on four occasions. The Director-General of the Naval Medical Service was present at three of the meetings. The Director-General of Army Medical Services was present at the first two meetings and sent representatives to the other meetings. In answer to Mr. Joynson-Hicks, Major Baird said that the Committee had arranged for the inspection of aerodromes. These inspections were being carried out by eleven senior medical officers of the navy and army, lent to the Royal Air Force. Reports had been received from them on nearly all aerodromes at which flying took place. All possible steps were being taken to meet the requirements for the medical service to the Air Force.

Retired Officers' Rights.—In reply to Major David Davies, on May 16th, Mr. Forster said that an officer of the Special Reserve placed on the retired list in consequence of wounds, but who had not relinquished his commission, was entitled to the gratuity awarded to officers who had left the service, and also to the issue of a Service Rendered Badge. They were permitted to wear uniform when employed in a military capacity, and on ceremonial occasions of a military nature.

Officers' Pensions Appeal Tribunal.—Sir A. Griffith-Boscawen, on May 16th, informed Sir M. Barlow that it was intended that officers invalided out of the Navy, Army, or Air Force, should have the right of appeal already possessed by non-commissioned officers and men as to whether their disabilities were or were not attributable to or aggravated by their naval or military service. A short time ago a special committee was constituted to act as the tribunal for dealing with officers' appeals.

Territorial Force Medical Officers' Gratuity.—Sir Watson Cheyne asked the Under Secretary of State for War, on May 13th, what was the reason why medical officers belonging to the Territorial Force could not be paid the gratuity which they had earned annually, as was the case with temporary medical officers, and was he aware that hardship often resulted from deferring this payment. Mr. Forster, in reply, said that the gratuity provided in the Pay Warrant for Territorial Force officers of all kinds was not payable until completion of service. In the case of the temporary medical officer the terms of the contract provided for the payment of an annual gratuity.

Malaria among Troops in Greece.—Mr. Macpherson, replying to Mr. Will Thorne on May 16th, said that the general health of the troops in Greece was good, but malaria was still prevalent. The admission rate for malaria, although high, was not due to serious cases. The death-rate fell from 5.64 per 1,000 in 1916 to 3.61 in 1917, and 2.51 for the first eighteen weeks in 1918.

THE WAR.

CASUALTIES IN THE MEDICAL SERVICES.

ARMY.

Killed in Action.

Captain P. B. Sewell, A.A.M.C.

Captain P. B. Sewell, Australian Army Medical Corps, was reported as killed in action, in the casualty list published on May 20th. He had previously been returned as missing.

Died of Wounds.

Captain R. MacGrath, R.A.M.C.

Captain Roger MacGrath, R.A.M.C., was reported as having died of wounds, in the casualty list published on May 18th. He graduated M.B., B.Ch., and B.A.O. in the National University of Ireland in 1914, joined the R.A.M.C. as a temporary lieutenant on January 25th, 1915, and was promoted to captain on completion of a year's service.

Captain J. K. Venables, M.C., N.Z.M.C.

Captain Joseph Kendrick Venables, M.C., New Zealand Medical Corps, died of shell wounds in a casualty clearing station on May 9th. He was the son of the late Joseph Venables of Christchurch, New Zealand, and took the Scottish triple qualification in 1914. After acting as house-surgeon of the Christchurch Public Hospital, he joined the New Zealand Medical Corps. He received the Military Cross on January 1st, 1918.

Died on Service.

Lieut.-Colonel A. G. Sargent, I.M.S.

Lieut.-Colonel Alfred George Sargent, I.M.S., died of angina pectoris in Mesopotamia on May 14th, aged 45. He was born on September 14th, 1872, the eldest surviving son of the late Lieut.-Colonel J. F. Sargent, I.M.S., and took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1896. Entering the I.M.S. as lieutenant on January 28th, 1898, he became captain on January 28th, 1901, major on July 28th, 1909, and lieutenant-colonel on July 28th, 1917. He served in the third China war of 1900, receiving the medal. Before the war he held the appointment of superintendent of Rangoon Lunatic Asylum and lecturer on materia medica in the Rangoon Medical School.

Wounded.

Major E. J. Bradley, M.C., R.A.M.C.(S.R.).
Major E. E. Herga, M.C., R.A.M.C. (temporary).
Major K. N. Steele, Australian A.M.C.
Captain H. F. Brice-Smith, R.A.M.C. (temporary).
Captain C. Cairnie, R.A.M.C. (temporary).
Captain C. K. Carroll, M.C., R.A.M.C. (temporary).
Captain J. Colgan, R.A.M.C. (temporary).
Captain E. Forbes, M.C., R.A.M.C. (temporary).
Captain R. I. Forsyth, Australian A.M.C.
Captain L. V. Gatt, R.A.M.C. (temporary),
Captain E. D. F. Hayes, R.A.M.C. (temporary).
Captain M. P. Power, R.A.M.C. (temporary).
Captain E. C. W. Starling, M,C., R.A.M.C.(S.R.).
Captain E. G. Thomson, Australian A.M.C.
Captain R. P. Wheeler, M.C., Australian A.M.C.
Lieutenant A. C. Reid, R.A.M.C. (temporary).
Lieutenant J. A. Stewart, R.A.M.C. (temporary).

Missing.

Captain A. B. Cluckie, R.A.M.C. (temporary).

Prisoners of War.

Major J. Kennedy, R.A.M.C.(S.R.).
Captain W. Arnott, R.A.M.C. (temporary).
Captain S. A. Forbes, R.A.M.C. (temporary).
Captain C. C. G. Gibson, R.A.M.C. (temporary).
Captain W. H. McCarter, R.A.M.C. (temporary).
Captain H. C. Martin, R.A.M.C. (temporary).
Captain E. E. Mather, R.A.M.C. (temporary).
Captain C. A. Meaden, R.A.M.C. (temporary).
Captain C. Mearns, R.A.M.C.(T.F.).
Captain R. M. Soames, R.A.M.C. (temporary).
Captain D. F. Torrens, R.A.M.C. (temporary).
Captain E. Underhill, R.A.M.C. (temporary).
Lieutenant J. A. Loughridge, R.A.M.C. (temporary).

Deaths of Sons of Medical Men.

Davies, Geraint, Captain, elder son of Dr. Morgan Davies of London, student of Guy's Hospital, died of wounds, April 14th, aged 22.

Davis, Guy Clifton, Lieutenant Northumberland Fusiliers, youngest son of the late Dr. Robert Davis of Orpington, Kent, died at a casualty clearing station on May 11th of wounds received on April 19th, aged 23. He got his commission on February 4th, 1915.

Harrhy, Ramsay, Corporal, late Captain, Bechuanaland Fusiliers, son of the late Dr. Harrhy, J.P., of Barkly West, South Africa, died of wounds, May 10th, aged 28.

Mason, Ethelbert, only son of Dr. J. R. Mason of Newcastle-upon-Tyne, died in France, May 12th. He was an undergraduate of the Durham University.

Sumner, Geoffrey, Lieutenant, son of Dr. Sumner of Waterloo, Liverpool, died on May 11th in his 22nd year. After joining the forces as a private in the Royal Field Artillery he obtained a commission in the Royal Air Service, but was subsequently invalided home on account of ill health.

Thompson, G. P. N., Lieutenant Royal Dublin Fusiliers, only son of Dr. C. J. Thompson of Newport, Isle of Wight, killed May 4th, aged 19. He was educated at Epsom College, got his commission through Sandhurst in July, 1916, became lieutenant in January, 1917, and went to the front in September.

Weir, T. H., Major Royal Engineers, second surviving son of Dr. J. Johnstone Weir of Jarrow-on-Tyne, killed May 8th. He became lieutenant in the Third Durham (Gateshead) Field Company of R.E. on May 11th, 1915, and got the command of a company last October. He had twice been mentioned in dispatches.

[We shall be indebted to relatives of those who are killed in action or die in the war for information which will enable us to make these notes as complete and accurate as possible.]

HONOURS.

The following special promotions are announced in recognition of the services of the officers mentioned in connexion with the recent attack on Zeebrugge: *To be Fleet Surgeon:* Staff Surgeon James McCutcheon, R.N. *To be Staff Surgeon:* Surgeon Henry St. C. Colson, R.N. Temporary Surgeon F. P. Pocock, M.C., R.N., is noted for early promotion. A statement of the individual services rendered by the officers promoted will be issued as an appendix to Vice-Admiral Keyes's dispatch.

Mentioned in Dispatches.

The first list of names brought to notice by Sir Douglas Haig in a dispatch dated April 7th, 1918, for distinguished and gallant services and devotion to duty between September 25th, 1917, and February 25th, 1918, includes temporary Surgeon W. J. McCracken, D.S.O., M.C., attached R.N.V.R., and Major and Brevet Lieut.-Colonel E. Ryan, D.S.O., R.A.M.C. The list of officers of the medical service mentioned in the dispatch will be published in a Supplement to the *London Gazette* at a later date.

Surgeon Maitland Bodley Scott, R.N., is among the officers mentioned in dispatches (*London Gazette*, May 17th).

Commended for Services.

The following are among the officers brought to notice by Lieut.-General Sir A. A. Barrett for valuable services rendered during the operations against the Mahsuds (March to August, 1917): Colonel P. Hehir, C.B., C.M.G. Lieut.-Colonels L. Addams-Williams, R.A.M.C., P. H. Faulkner, R.A.M.C., G. G. Giffard, C.S.I., I.M.S., C. H. S. Meyer, I.M.S., F. R. Ozzard, I.M.S., J. B. Smith, I.M.S. Majors C. C. Murison, I.M.S., G. E. Stewart, I.M.S. Captains J. A. Sinton, V.C., I.M.S., J. M. Weddell, R.A.M.C. 1st Class Assistant Surgeons H. A. Poyntz and W. H. Thipthrop, I.S.M.D.; and Dr. R. Cox of the Church Missionary Society.

NOTES.

Conference on Care of Disabled Men.

The work of the Inter-Allied Conference on the after-care of discharged sailors and soldiers has proceeded at the Central Hall, Westminster, this week, in accordance with the programme published in this column last week. The conference, which is attended by representatives of the United States, France, Italy, Belgium, Canada, Portugal, and Serbia, and by about one hundred British representatives, including those from Australia, New Zealand, South Africa, and India, was opened by the Duke of Connaught on Monday, when Mr. Hodge, the Minister of Pensions, was in the chair. The Duke's speech of welcome was acknowledged by Dr. Bourrillon for France, Professor Enrico Burci for Italy, and Lieut.-General Melis for Belgium. Apart from the work done in the sections a great deal of interest has been excited in the exhibition, which was visited by the King and Queen on Monday. It consists partly of soldiers' work in various trades, and partly of artificial limbs and appliances, also, in many cases, made by

disabled men. Italy, whose representatives have taken a large part in the work of the sections, makes a very effective display in the exhibition. The French exhibition is largely concerned with the work of the re-education schools at Paris, Havre, Lyons, and Marseilles. The British display is mainly from the various military orthopaedic centres in this country. The Canadian and Australian sections are also very interesting, and much of the work done is for their hospitals in this country. The Scottish Hospital for Limbless Sailors and Soldiers at Erskine is represented, and it was shown that the pattern shops of the Clyde have co-operated in making artificial limbs on a standardized plan. The Serbian Red Cross has a most interesting exhibition, chiefly of artistic work made from war débris.

During the week delegates have paid visits to various institutions for disabled men in the neighbourhood of London, and on Tuesday, May 21st, they were entertained at dinner to the number of between one and two hundred by the Lord Mayor of London.

Scottish Women's Hospital with the Serbian Army.

The Elsie Inglis Unit of the Scottish Women's Hospitals, which left London at the end of February, after inspection by the King and Queen, reached its destination on the Macedonian front on April 1st, and the camp was ready for the reception of patients a fortnight later. The Jugo-Slav division of the Serbian army, to which the unit is attached as sole field hospital, has been in severe fighting since then, and the wards are now filled with sick and wounded brought straight from the front. The hospital has its own transport, and the girl drivers make daily rounds with the motor ambulances to fetch in the cases.

England and Wales.

London Water.

In his twelfth annual report Dr. A. C. Houston, Director of Water Examination, Metropolitan Water Board, records the results of the chemical and bacteriological examination of the London waters for the twelve months ended March 31st, 1918. From March, 1915, onwards "resistance to filtration" experiments, which had been made from time to time for twelve years, were systematized and a bi-weekly check kept on the quality of all the prefiltration waters, twenty to twenty-four in number. The results are of considerable practical as well as scientific importance, as upon them, it is said, depends the possibility of anticipating filtration difficulties by inhibitory algicidal treatment. Though algal growths can be destroyed, yet the risk may remain of other and more resistant growths taking their place. A notable instance occurred in 1917 during the continuous treatment of No. 1 reservoir at the West Middlesex works with copper sulphate (1 in 4 millions). While the growths (*Fragillaria*, *Asterionella*, *Stephanodiscus*, filamentous confervoid growths, etc.) affecting the neighbouring reservoirs were almost completely held in check, a fresh growth, composed of cells so excessively minute that they readily passed through four folds of fine linen, developed abundantly, and caused serious blocking of the filters. In his twelfth research report Dr. Houston dealt in detail with the successful results of the chlorination of raw river water, and showed that a better water could be provided, with a saving of coal and cost generally.[1]

Last year it was reported that experiments with liquid chlorine had been started, with gratifying results. This year, he says, a much more cautious opinion must be expressed, not of the efficacy of chlorine as a germicidal agent, but of the difficulties that have to be overcome in adding this reagent to water in the proper dose. With the apparatus used successful results were obtained during the warm weather, but when the air and water temperature fell below a certain point there was trouble. Practical experience during cold weather shows that either the gas must be added as a solution to the water to be sterilized or some improved form of porous diffuser must be discovered. Taking a period embracing the bad winter months, from October, 1917, to the end of March, 1918, the average chlorinated raw river water results work out at 83 per cent. "negatives" and 17 per cent. "positives," figures which show that, as judged by the *B. coli* test, better results can be obtained by chlorination than by storage. Despite the magnitude of treatment (70 to 80 million gallons daily) no complaints as to taste were received. Storage, however, has an important "levelling" or "equalizing" effect. A clear saving of nearly £12,000 a year has been effected by substituting chlorinated for stored river water, but Dr. Houston does not attempt to plead that the former gave not only equal but additional security to the consumer. If, however, chlorinating the water were to lead to the blocking of the sand filters, this might be urged as an objection to the method. Dr. Houston considers that, though it may be presumed that after the war the cost of pumping will fall in far greater ratio than that of chlorination, the margin will always be in favour of chlorination. The two great factors which militate against successful chlorination are extreme cold and short contact. Separately, and still more in conjunction, they tend to prevent sterilization, or if sterilization takes place owing to a superdose—that is, a dose in excess of what is actually required under more favourable working conditions—the water is apt to have a chlorinous taste and to contain active chlorine. Dr. Houston sets forth the results of his experiments in a number of clearly arranged tables.

[1] British Medical Journal, July 21st, 1917, p. 97.

King Edward's Hospital Fund for London.

The annual meeting of the Governors and General Council of King Edward's Hospital Fund for London, to receive the accounts and the report of the General Council for the year 1917, was held at St. James's Palace on May 14th, the Speaker of the House of Commons being in the chair. Lord Revelstoke (the hon. treasurer) was able to report that the Fund had again made a substantial increase in the distribution, and had also added to its reserves. If the ordinary income showed no decrease the Fund should be able to maintain the distribution at or near the total arrived at in 1917. Mr. Frederick M. Fry (hon. secretary) presented the draft report of the Council for the year 1917. The grants amounted to £190,000, being £20,000 more than in 1916. The expenses of administration were £1 9s. 0½d. per £100 of the total amount received, in spite of the increased cost of printing and paper. Sir Henry Burdett drew attention to the importance of keeping up and increasing the amount received from subscriptions and annual donations, and Lord Somerleyton undertook to bring the matter before the Executive Committee.

Central Midwives Board.

At a meeting of the Central Midwives Board on May 16th, Sir Francis Champneys presiding, the re-election for one year of Mr. Sangster as a member of the Board was announced. It was decided to call the attention of the Local Government Board to a form issued by a local supervising authority, and particularly to the note at the foot, which seemed to the Board to be an endeavour to enforce the notification of pregnancy on midwives, and to ask the Local Government Board to deal with the matter. It was decided to bring the action of a medical practitioner in giving a certificate to an uncertified woman stating that she was "quite capable of undertaking the duties of an ordinary midwife," to the notice of the General Medical Council, and to express the Board's willingness to appear as prosecutor, if desired, should the Council take action in the matter. Seven women were removed from the roll on their own applications. It was decided to increase the price of the Midwives Roll to one guinea, and to ask the Treasury to contribute £117 3s., the estimated cost of 375 copies of the roll additional to those required for sale to the public.

Scotland.

The work of the Glasgow Day Nursery Association is about to be transferred to the Corporation of Glasgow. The association has been at work for thirty-five years and its nurseries are well equipped, but the funds at its disposal are too limited to allow the full development of a child-welfare scheme by it.

Neurasthenic Soldiers.

At a meeting of the Scottish Joint Institutional Committee, over which Sir A. Griffith-Boscawen, M.P., presided last week, it was reported that the extension of Craigend

neurasthenic home was proceeding satisfactorily and would provide beds for fifty or sixty patients. The orthopaedic annexe at Tynecastle would shortly be ready. The Chairman pointed out that under the new pensions warrant allowances would be paid to the families of men undergoing treatment for disabilities not attributable to service. Dr. Fletcher Porter stated on behalf of the Ministry of Pensions that, owing to new arrangements made by the Army Council, these cases would in future be treated in special hospitals before discharge. It seemed probable, therefore, that no soldier would be discharged who required institutional treatment for any functional nerve disorder. A scheme for making additions to the Springfield farm colony for tuberculosis is under consideration.

Ireland.

WE are informed that Captain J. C. McWalter, M.D., R.A.M.C., has been invited to become a candidate to represent the National University of Ireland in Parliament, and has given a provisional consent. It is, we are informed, expected that a candidate in the Sinn Fein interest may also contest the seat. Captain McWalter, who has been a member of the senate of the university since 1914, is an alderman of the city of Dublin, and was chairman of the Dublin Insurance Committee until he joined the R.A.M.C.

THE CONTROL OF SYPHILIS.

At a meeting of the Section of State Medicine of the Royal Academy of Medicine of Ireland, on April 12th, with the President, Sir William Thompson, in the chair, Dr. Kirkpatrick read a paper on the state and syphilis. He outlined the action of the state in England in its control of prostitution since the time of Henry II, and referred to the regulations enforced in Scotland at the end of the fifteenth century for the prevention of the spread of syphilis. In England an Act was passed in the middle of the eighteenth century regulating the method of prosecuting those who kept bawdy houses. Dr. Kirkpatrick discussed the recent legislation that has followed the publication of the report of the Royal Commission on venereal diseases, and the schemes at present under the consideration of some of the Irish sanitary authorities. He urged the cordial co-operation of all medical men in the carrying out of such schemes. Sir John Moore drew attention to the fact that in the Venereal Diseases Act, 1917, medical treatment by unqualified persons was for the first time in England made illegal. Professor McWeeney said that some Dublin hospitals would not undertake the treatment of patients suffering from these diseases in an infectious stage, while the authorities of some of the university and college laboratories objected to such patients attending the laboratories for the purpose of diagnosis. Dr. Crofton said that as it was almost impossible to say when patients with venereal diseases were cured, more was to be hoped for by prevention than cure. He advocated strongly the use of prophylactic applications to prevent infection. Sir Andrew Horne referred to the advantages and limitations of the Dublin Lock Hospital. He believed that syphilis in Dublin was increasing, and urged the importance of establishing places where patients suffering from it could be adequately treated. Dr. Coey Bigger gave an account of the action taken by the Local Government Board for Ireland. He hoped that shortly there would be several schemes for treatment started in Ireland. Dr. Joseph Bigger described the work that had been done in Sheffield under the scheme in force there. He pointed out the great difficulty in making a diagnosis of gonorrhoea in the laboratory. The President referred with satisfaction to the change in public opinion with regard to the treatment of patients suffering from these diseases, and from this change he expected and hoped that a great improvement in public health would result.

THE Town Council of Madrid has decided to establish a school of "Maternology" to be under the direction of the professors of the municipal institute of puericulture. Practical courses of instruction will be given at various centres in the capital.

Correspondence.

A MINISTRY OF HEALTH.

The British Medical Association Scheme.

SIR,—I have read the pamphlet, *A Ministry of Health*, issued by the British Medical Association, with interest, but to me the whole scheme is humdrum and unimaginative: there is no insight or ideal. It contains no bold device for the betterment of the people, or the improvement of the lot of the general practitioner, and little for the advancement of medicine. It may be said to be only the glorification of the national insurance.

No reference is made to the doctrine that it is the duty of the doctor to cure the patient in the least possible time, so as to return him to work as soon as may be, and the duty of the patient to do all he can to promote his own recovery, although the whole scheme is good or bad according to the degree in which it enables this to be effected. I make bold to maintain that the doctor cannot give efficient attention to every case so long as he knows that he has to work at high pressure to earn enough to keep the home together—it is not fair to either the doctor or the patient. It follows that more doctors are urgently needed, even in times of peace, and to get them it is essential that the conditions of work should be improved, including the pay. It is suggested that practitioners should be encouraged to specialize; they have not the time at present, yet the mass of clinical material they see would be most valuable if it were only collected. The continuance of the voluntary hospitals, with their debts to hamper their work and their long waiting lists, is advocated on the ground that they compare favourably with the hospitals of certain Continental countries, whereas it is just as reasonable to say the difference is due to national characteristics and traditions. There must be far more hospitals, and to try to combine voluntary and state ones would be fatal.

A state service would involve all branches of medicine being under the state—hospitals, schools, qualifications, research, etc. The state would obtain drugs and appliances at a much more economical rate than is now paid under insurance. To the members of the profession it would mean better conditions generally—if not, the whole thing would be a failure as great as the present state of things—better pay, better conditions under which to work, better opportunities for improving one's knowledge, better chances of rest (for example, holidays), better chance of retiring owing to the pension; to the public it would mean better treatment and an earlier return to work; to the state it would mean increased powers of production. I have not referred to the nurses, dentists, and dispensers, but they would have to be incorporated in the state service.

I doubt whether there is a calling, except the Church, which can claim such unselfish work as the medical profession. Our aim is the betterment of the lot of humanity, our thanks are often kicks. If we are to be in a condition to realize our aims, it is essential that we should have our own condition improved. "The greatest good for the greatest number" is really our ideal, and it is from that standpoint that we must build any suggestions we have to offer, and remember that for each of us there are roughly two thousand other persons in these islands.

I do not suppose that any one who is interested in the health of the nation wishes to "raise false hopes" or anticipates a "sanitary millennium" any more than a moral millennium; what is wanted is a scheme which will permit of the grafting on to it of each improvement with the least possible disturbance. The British Medical Association scheme does not appear to do so.

Maternity hospitals are suggested, but not the suppression of the midwife. We appear to have forgotten the outcry about giving the mother in labour over to an inferior class of practitioner, yet it is still true that no labour is free from danger till an appreciable time after it is completed.

The choice of doctor is really a very beautiful idea, worthy of the poet's song; but is it practical to-day? So long as every individual can afford to pay a doctor privately no interference is needed, but as soon as some people need assistance to obtain treatment there is no logical reason why others should not claim it. Why

should X. have to pay for Z.'s medical treatment and not be able to obtain assistance when he is ill himself? The lack of means has cost many an one his or her life; what has it cost the country? Every individual has a right to be supplied with medical treatment by the state, and the state has a right and a duty to supply it if it considers the best is not obtained. A conservative British nature will grumble at first at the loss of choice and then willingly acquiesce, later on to praise the arrangement, if only because it was thought to be British.

There would always be a certain number of people who could afford to engage a private doctor and pay good fees, so that those who did not want to remain in the service could try their luck outside, but the existence of a public service would be a sufficient excuse for keeping fees at a high level.

The whole change would probably require considerable time to effect, but so long as a definite plan existed it could be carried out systematically; but, in any case, one upheaval is better than repeated tinkering with an unsatisfactory condition of things.—I am, etc.,

Mumbles, May 18th. F. DE COVERLY VEALE.

EXTRA RATIONS FOR TUBERCULOSIS PATIENTS.

SIR,—The fact that the profession are asked to fill up the required forms specifying the amounts of meat and butter to which patients are entitled suggests that we should discriminate between those likely to benefit from the extra ration and others who are too ill to require it. It is possibly eaten by other members of the family who are not entitled to benefit.

A patient to whom it was refused raised an objection, and I therefore wrote to the Ministry of Food for instructions, and in reply was informed "All cases of active tuberculosis are eligible for extra rations of meat and butter but not sugar, and should be notified." Of course all cases are notified, but this reply suggests that the profession might be saved much time and difficulty in decision if the local food office were confidentially supplied with a list of notified cases, and themselves issued the necessary forms, for in many cases it takes a brave man to say that the disease is no longer active and does not require extra feeding to prevent recrudescence.—I am, etc.,

Halstead, Essex, May 15th. C. GORDON ROBERTS.

ACUTE GONORRHOEA TREATED WITH VACCINES.

SIR,—In his article on vaccine treatment in acute gonorrhoea (BRITISH MEDICAL JOURNAL, 1917, vol. ii, p. 450) Captain N. P. L. Lumb, R.A.M.C., arrives at a series of conclusions which appear to be quite unwarranted. His thesis is that vaccines are of considerable value in the treatment of acute gonorrhoea. His method is to give two courses of vaccine treatment, each course consisting of six doses extending over fifteen days, the two courses occupying forty days, allowing for an interval. Now before the results can be of the slightest value in a comparative sense, no treatment other than vaccine treatment must be employed at the same time. But in Captain Lumb's series of cases, in addition to and contemporaneously with the administration of vaccines, the patients were having irrigation by Janet's method twice daily. It must be clear to Captain Lumb that before his results can pretend to be of any value he must have other methods of treatment with which to compare them. For instance, if out of 300 cases he had treated 100 with vaccines alone, 100 with Janet's lavage alone, and 100 by the two methods combined, then there might have been some value in his publication.

His results in five hundred cases in no manner justify his contention that vaccines are of any great value in acute gonococcal urethritis. They are in no way striking, and the value of the treatment seems to be rather, as judged from the results, below the ordinary.

When the Janet method of *grand lavage* alone is properly carried out, much better results are obtained and the proportion of complications is less than in Captain Lumb's series of cases. The explanation of the occurrence of 26 per cent. of complications—epididymitis, prostatitis, etc.—is obviously that "the patient is instructed to thoroughly wash out the anterior urethra first and then to get the solution into the bladder." It shows a high degree of optimism to expect that the patient will be able to carry out these instructions. Experience has shown that it is only in rare instances that such will be done. The usual result of allowing the patient to carry out the irrigation himself is to ensure the conversion of an anterior infection into a posterior one with the complications of epididymitis, prostatitis, and cystitis.

Regarding the general effects upon the patient all of them—mental relief at the rapid disappearance of the discharge, rapid disappearance of pain, and that exercise can be taken without delaying the cure—can be attained as rapidly, if not more so, by the method of lavage alone. Were the treatment carried out by injection of vaccines alone there would be some justification for the assertion made by Captain Lumb that his method has a beneficial effect upon the mental state of the patient in that "anything which tends to turn his thoughts away from the site of the disease and associated ideas is valuable." But as the treatment partially consists of Janet irrigations twice daily, which must direct the patient's attention to the site of the disease, the statement just quoted seems to be devoid of point.

Captain Lumb's article is apt to lead others to imagine that there is some clear value in vaccine treatment, a thing which has only been asserted but not proved in his publication. The danger of Captain Lumb's statement is that others may act upon it, and waste time by treating cases of acute gonorrhoea by vaccines alone, or combined with a modified course of irrigations not thoroughly carried out.—I am, etc.,

Mesopotamia, March 16th. E. T. BURKE.

QUININE IN MALARIA.

SIR,—After over twenty-five years' experience of malaria in far apart tropical and subtropical countries, I still maintain that quinine is a good prophylactic and a good drug in the treatment of this disease. My cases got well or improved, after I learnt from experience how and when to administer quinine.

It was, and for all I know is still, the custom in tropical countries for newcomers to be told by doctor and layman, "You must take a good pinch of quinine every day—10 gr. or so—in tabloid or wrapped up in a cigarette paper." The newcomer generally does so, and as a rule gradually develops indigestion, with vomiting, suffers from inanition, becomes cachetic, and gets malaria *plus* quinine poisoning. The doctor is sent for, and as a rule prescribes a large dose of solid quinine. The patient becomes worse, and the quinine is blamed.

A good many years ago on the West Coast of Africa I was dosed with quinine as a prophylactic, as described. I did not contract malaria, but I developed indigestion and gastritis due to the irritant effect of the solid quinine, little, if any, of which was dissolved by the gastric juice at first, and none at all later on.

Years later I contracted malaria in Marysville, California, and was nearly poisoned by a well-meaning physician, who dosed me with solid quinine. Later I held an official appointment in Rhodesia, where malaria of a severe type was rampant in the outlying camps. I treated it in the way I had been taught, and allowed the officers and men to follow the instructions issued by those in authority, namely, to dose themselves daily with quinine powders or tablets. I myself got a severe attack of malaria contracted at a pestilential camp, and then learnt useful facts about quinine, which, although probably known to many, are worth setting forth, namely:

1. To administer calomel always before giving quinine, unless calomel is contraindicated by some other disability of the patient.

2. Never to give quinine in solid form by the mouth or rectum, but always in solution (in dilute sulphuric acid by preference).

3. Never to give quinine during a high rise of temperature, but to wait until it has subsided in the ordinary way, or been reduced by sponging, etc.

4. Never to give quinine on an empty stomach, and in many cases to give alcohol in a moderate quantity almost immediately after the quinine, or champagne in exceptional cases.

5. To build up the strength of the patient by every means available during the periods of intermission.

6. Never to neglect the idiosyncrasies of each patient, his response to small or large doses, and the general effect of the drug upon him.

7. To discourage the indiscriminate and unscientific method of "shovelling" large quantities of solid quinine into each and every stomach irrespective of the constitution, temperament, and chemical reaction of the individuals concerned.

I found that the administration of quinine given without attention to these rules was the cause of much illness amongst officers and men, that their constitutions and resistance became weakened, and when they developed malaria generally suffered severely.

From experiments upon myself and others I found quinine a good prophylactic given as follows: On the first of the month, say, a dose of calomel to suit the individual was administered, and, after the bowels were well cleared, 15 grains of quinine dissolved in dilute sulphuric acid was given, after a good meal. On the 15th of the month another dose of calomel and another dose of quinine (15 grains) was given, and the individual was advised to pay strict attention to the bowels at all times.

After adopting this plan malaria became less frequent and severe in camp and out-stations, and was more easily treated.

In the treatment of malaria I found quinine satisfactory when given with due regard to the points above enumerated.

I met the late Professor Koch when he was in Bulawayo. He told me he had always adopted the rules I mentioned, and that neither he nor his assistants suffered from malaria during their long residences in malarial districts. —I am, etc.,

London, W., May 21st. EDWARD YEATES, F.R.C.S.I.

"BOTULISM" AND MENINGITIS.

SIR,—Would your readers care to learn from one who has been over-persuaded by the recent Local Government Board memorandum on "an obscure disease with cerebral symptoms"?

My case was in the Evelina Hospital—a child of 6 years, who became drowsier and drowsier until she would, for example, fall asleep over her meals in bed; but she was never comatose and could be roused easily enough. She developed bilateral ptosis, dilated pupils, pyrexia, constipation, and retention of urine. She had no other paralysis, no rigidity, no fits, no optic neuritis, and no Cheyne-Stokes breathing. Lumbar puncture brought no fluid, though we tried half a dozen times.

Fortified by what we had read we all thought she must be our first case of botulism—until she died and Mr. Leatham demonstrated tubercles in the pia arachnoid.— —I am, etc.,

London, W., May 20th. DAVID FORSYTH.

UNIVERSITY REPRESENTATION IN PARLIAMENT.

SIR,—In reply to Dr. Kingdon, I would point out that the reason no invitation to our meeting was sent to him was that in the London section of the *Medical Directory* his address is given as c/o British Medical Association, 429, Strand, W.C.2 (on military service). From this I assumed that he was overseas, and therefore would not be able to attend.

I am sorry he should be aggrieved, but we did take great pains to find names and addresses of graduates, a somewhat difficult matter.—I am, etc.,

HERBERT G. WILLIAMS,
Hon. Sec., Combined Universities Conservative and Unionist Association.

London, S.W., May 18th.

WHAT IS A CONSULTANT?

SIR,—As a general practitioner, in a rural district with no druggist, I sent a patient with my letter to a specialist, who saw the patient, wrote to me, gave a prescription, and took his fee as a specialist, and the prescription is brought to me to be dispensed. This has been done now for many months; during this time the patient has gone up to town and seen the consultant occasionally, and for all this time I have not been called in once to that patient. It seems to me that my patient was seen once as a specialist and ever after as a general practitioner. If this is so, I must in future refuse to give my good patients away and to become (because we have no druggist) the specialist's dispenser.—I am, etc.,

May 18th. GENERAL PRACTITIONER.

REMOVAL OF WORM (FILARIA LOA) FROM THE EYE.

SIR,—In my paper which appeared in your issue of May 4th, 1918, I stated that the worm was a female. The specimen was examined for me by a tropical expert, and the statement was made on the strength of his evidence. Dr. Leiper has since kindly examined the worm, and has conclusively demonstrated to me that it was a male. I greatly regret the error, and shall be obliged if you will allow me to put the matter right as soon as possible.— I am, etc.,

London, W., May 21st. R. H. ELLIOT.

The Services.

PAY AND GRATUITY OF TERRITORIAL OFFICERS.

WE would refer a correspondent who asks a question on this subject to Section VI of the Royal Pay Warrant of the Army, which deals *inter alia* with the emoluments of officers of the Special Reserve of Officers and Territorial Force employed on army service.

Article 496 (*b*) lays down that officers specially taken into employment by reason of a national emergency shall receive while so employed the same rates of pay and allowances as officers of corresponding army rank in the same arm or branch of the service; or if holding a command, or employed on the staff, the rates of consolidated pay laid down for their appointments. Such officers may include those of the Special Reserve of Officers and Territorial Force employed with the Regular Army.

Article 497 lays down that officers employed under the above conditions shall, provided that they serve for the full period of their engagement, or of the emergency in respect of which they are employed (unless a shorter period is specially approved by the Army Council), be entitled on the cessation of such employment to a gratuity at the following rate: 124 days' pay for the first year of service, or any part of a year, and sixty-two days' pay for each subsequent year of service, or part of a year. For the purpose of such gratuity pay is held to mean regimental, departmental, or staff pay only, and not to include additional pay of any kind, or (except in the case of officers drawing consolidated rates) allowances.

Reference may also be made to Mr. Forster's reply to Sir Watson Cheyne in the House of Commons, reported on page 599.

PROMOTION OF NAVAL SURGEONS.

AN Order in Council, published on May 17th, authorizes the Lords Commissioners of the Admiralty during the period of hostilities and for twelve months thereafter to dispense with the prescribed examination to qualify for promotion to the rank of staff surgeon, R.N., and to promote to the rank of staff surgeon all surgeons qualified by length of service, with retrospective effect accordingly where necessary, who have had uniformly good reports during their naval service, and who are recommended for such promotion by the Director-General of the Medical Department, R.N.

AIDES-DE-CAMP FOR MEDICAL GENERAL OFFICERS.

SURGEON-GENERAL G. J. H. EVATT, C.B., A.M.S., ret. (London, W.), writes: Wherever a medical "general officer" is employed either in direction of the medical affairs of a "command" in England or of an "army corps" or "army" in the field, he should "by order" have an aide-de-camp on his personal staff.

2. This officer should be a medical officer not above captain's rank, and should have gone through four months' staff training in the head quarters offices of a "command" at home or abroad.

3. An aide-de-camp attends to the housing, the feeding, and the transportation of his chief, and so greatly helps that officer's fitness in the field. I have seen pitiful results from the absence of such an officer on a directing medical officer's staff. Further, the aide-de-camp acts as "gentleman usher" to his chief, and prevents his being intruded on by every casual inquiring visitor. He is able to see visitors, and himself give them much of the information they desire. He also can be sent on messages to distant officers, to convey important orders—or to make inquiries of a confidential character. A young man himself, he hears the gossip of the camp, often very valuable to know, and he learns either of neglects or failures which would never come direct to a medical general officer's ears. For want of such an officer, directing medical officers of considerable age and seniority have broken down in the field, or come back as wrecks after directing the medical affairs of a stiff campaign.

I strongly advise the recognition of such an officer, and compulsory orders should exist directing general medical officers to nominate such a personal staff officer. I am positive that a

medical officer employed in this capacity during a campaign, so far from being injured in his medical or sanitary efficiency by this duty, would, at the end of his term of service, be a far more valuable medical officer than he could have been without this experience. Whatever he may cost the state he will amply repay that expenditure in the bettered efficiency that may result to the medical service in the field. We failed in our old wars largely for want of a trained directing staff, and the absence of an aide-de-camp has helped on failure, and has at times broken down completely the health and efficiency of medical directing officers.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

THE Senate has elected Dr. F. Gowland Hopkins, F.R.S., Professor of Biochemistry, as the Representative of the University on the General Medical Council for a term of five years, in succession to Professor Sir Clifford Allbutt, who did not offer himself for re-election.

At a congregation held on May 18th the degree of M.D. was conferred on W. C. D. Maile.

UNIVERSITY OF EDINBURGH.

Finance.

THE General Council of the University, on May 16th, approved an ordinance containing regulations for the administration of the finances of the university. The ordinance in force dates from 1893, and requires that a number of funds should be administered separately and independently. Experience has shown that this is inimical to the free development of the university. Another defect was that the salaries of the professors fluctuated according to the state of the fee fund at the moment; many of the salaries were too low, not exceeding £600 in a number of instances. The new ordinance would bring all the funds into a general revenue and expenditure account, and under it a professor's salary would never fall below £700. The Principal said that the purpose was not so much to alter professors' salaries as to simplify the university accounts. He added that Edinburgh had suffered more than any other of the universities, except possibly Oxford and Cambridge; in three years of war its loss in fees amounted to £52,000, and the net result was to leave it £27,000 to the bad. Though the position had been relieved by a special Treasury grant of £14,500, it still caused anxiety.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

THE following were, on May 16th, admitted Fellows: J. J. Armistead, W. T. Garretson, S. Green, E. W. Lewis, V. D. Nimbkar, E. H. Roberts, A. L. Yates.

The Bathgate Memorial Prize has been awarded to Miss Janet A. A. Sang.

Obituary.

JOHN COUPER, F.R.C.S.,

Consulting Surgeon to the London Hospital.

MR. JOHN COUPER, for many years surgeon to the London Hospital, died on April 30th. He was of ancient Scottish lineage, and studied medicine in the University of Glasgow, of which university his father was professor of materia medica. He was born in Glasgow, and received his preliminary education there, but subsequently went to Paris to perfect his knowledge of French. He graduated M.D. Glasg. in 1858. In the following year he became M.R.C.S., and a Fellow in 1861. At Glasgow he attended the anatomy lectures and demonstrations of Professor Allan Thompson, and in London he was a student of Professor Ellis and Professor Sharpey. For a short time he went to Berlin and studied surgery under Langenbeck. Upon returning to London he became assistant surgeon and demonstrator of anatomy to the London Hospital, and was afterwards surgeon and lecturer upon surgery. He was one of the earliest promoters in London of the antiseptic system of surgery, a knowledge of which he had acquired from Lister at Glasgow. In fact, he established Listerian treatment at the London Hospital many years before Lister himself brought it to King's College. As a speciality he adopted ophthalmology and became clinical assistant to Critchett at Moorfields. At the meeting of the British Medical Association at Newcastle in 1870 he contributed a valuable paper upon the diagnosis of astigmatism by the ophthalmoscope. Upon retiring from active practice he went to reside first at Ellesborough, in Buckinghamshire, but subsequently removed to Falmouth, where he died and where he is buried.

Mr. Couper was of a retiring disposition. He catered little for popularity, but possessed many warm friends. Any medical views he had to express (and all his views were valuable) he communicated quietly to the transactions of one of the medical societies. Mr. Couper leaves to mourn his loss (a loss which will be felt far outside his family circle) a widow, three daughters, one of whom is married to the vicar of Ellesborough, and a gallant son, Colonel Duncan Campbell Couper, R.E., now at the front.

RICHARD GRAINGER HEBB, M.A., M.D.CAMB., F.R.C.P.,

Consulting Physician and Physician-Pathologist to the Westminster Hospital

WE regret to record the death, on May 12th, of Dr. R. G. Hebb. He was the eldest son of the late John Hebb of East Dulwich, and received his medical education at the University of Cambridge and King's College Hospital. He obtained the M.R.C.S. diploma in 1874, the M.D. degree in 1880, and was elected a Fellow of the Royal College of Physicians in 1891. In 1888 Dr. Hebb joined the teaching staff of the Westminster Hospital, and held for many years the two offices of physician and director of the pathological department. He was also pathologist to Queen Charlotte's Hospital, and for a long period secretary and editor of the Royal Microscopical Society, which recognized its indebtedness to him for the high standard maintained by its journal. He served as a civil surgeon in the Zulu war of 1879, and on the formation of the territorial hospitals received a Majority, but unfortunately his ill health prevented him from taking an active share in the work of the 4th London General Hospital, to which he was posted. He had been an examiner in medicine at the Royal College of Physicians and in the University of Cambridge; he held the office of reader in pathology in the University of London. In his more active days he was secretary of the old Pathological Society.

No member of the staff of the Westminster Hospital in the last thirty years exercised so great an influence over the students or was so universally esteemed for the precision of his knowledge, for his entire freedom from professional cant, and for his essential probity of character; to none did old students return in after years with more affectionate or grateful remembrances. As a physician in the out-patient department Dr. Hebb's teaching of physical signs was invaluable, for his perceptions were acute, his mind sceptical and almost entirely free from self-deception. But not every student could learn from him. In the wards in later years he attracted few besides his clinical clerks, but they certainly never failed for want of drilling in the elements of clinical observation. So it was with his systematic lectures; they were sound but unattractive. On the other hand, his demonstrations of morbid anatomy had become a tradition in Westminster; they were at one time largely attended by practitioners and colleagues as well as by the students; they were a continual delight; in themselves almost a liberal education.

Of his own work in pathology none but those who worked with him will ever appreciate its worth; he wrote but little, though his experience was great and his memory very remarkable. His modesty was so ingrained that the value of his observations was discounted by a reluctance to publish that owed something also to a rather cynical sense of the fleeting value of many contributions to the professional press. One who worked with him for years says that whilst his perceptions and descriptive powers were great, he was lacking in scientific imagination; hence it came about that many "discoveries" by other workers depended upon observations with which he had been familiar for years, but which he had failed to visualize in form or context communicable to the world. Scholar and gentleman, his teaching will long bear fruit in the work of generations of students who owe their fundamental ideas to him.

OWEN MEREDITH JONES, F.R.C.S.Eng., F.A.C.S., died on April 3rd at Victoria, Vancouver Island, where he practised for thirty years, and was long known as the leading surgeon in the west of Canada, enjoying besides great credit up and down the whole Pacific coast. Born fifty-five years ago at Carnarvon, and a student of the London Hospital, he went out to the coast in 1890 as surgeon of H.M.S. *Warspite*, and, leaving the navy, married and took

up practice. His wide knowledge, sound judgement, and great operative skill established him within the profession there as its leading consultant. His personal charm and sympathy endeared him to his patients. His devoted, unremunerated, and skilful attention to the wounded returned from the war, was crowned with remarkable success. As a doctor in Victoria writes: "The number of cripples he has restored is wonderful. . . . He certainly gave himself for the returned men, and they are grateful. . . . At a memorial service in Christ Church Cathedral on April 7th, nurses, doctors, and returned men occupied the middle of the nave, and the rest of the church was packed with patients. The Bishop preached." Dr. Jones will be greatly missed, not only from the Dominion and Provincial Medical Councils, but because of his great influence always exercised on behalf of the medical profession, and the action it knew to be needed in all matters of public health and morals. His eldest son, at the beginning of the war a second year medical student, is still serving in France with the C.A.M.C.

DR. JEAN JOSEPH PEYROT, surgeon to the Lariboisière Hospital, and lecturer on surgery in the University of Paris, died recently at the age of 74. He was a member of the Académie de Médecine, very popular as a teacher and distinguished as an operator. He was the author of many monographs, among them being one on the surgical treatment of intestinal obstruction, which is regarded in France as a classic. He contributed the volume on diseases of the neck, chest, and abdomen to the *Manuel de pathologie externe*, which under the name of the "Manuel des quatre agrégés," was the favourite textbook with the generations of students who followed each other in the French schools from 1885 to 1900. Of the four authors the only survivor now is Professor Kirmisson. The others were Reclus, who died on the eve of the declaration of war, and Bouilly, who fell a victim to cancer of the tongue some years before. Professor Peyrot was elected to the French Senate to represent the Dordogne in 1903.

COLONEL CHARLES FANCOURT WILLIS, C.B., Bombay Medical Service (retired), died at East Grinstead, Sussex, on April 28th, aged 63. He was born on May 22nd, 1854, and educated at St. Thomas's Hospital (taking the M.R.C.S. in 1875, the L.R.C.P.Edin. in 1877, and the M.R.C.P.Edin. in 1882) and at Durham University, where he graduated M.B. in 1879 and M.D. in 1887. After filling the post of clinical assistant at the Royal London Ophthalmic Hospital and at Newcastle Eye Infirmary, he entered the I.M.S. as surgeon on October 31st, 1879. He became surgeon-major on October 31st, 1891; lieutenant-colonel on October 31st, 1899; was placed on the selected list on May 24th, 1904; and promoted to colonel on November 14th, 1908, retiring on October 1st, 1913. Before his promotion he was civil surgeon of Satara, and as colonel was P.M.O. of the 5th (Mhow) Division. He served in the Egyptian war of 1882, in the battle of Tel-el-Kebir, and in the forced march to and occupation of Cairo (medal with clasp and Khedive's bronze star); in the North-West Frontier campaign of 1897-98; in the operations in the Kurram valley (medal with two clasps); and in the Tirah campaign of 1897-98; in the reconnaissance of the Khamana defile and action of November 7th, 1897; and in the operations against the Khani Khel Chamkanni tribe (mentioned in dispatches, G.G.O. No. 244 of 1898, clasp). He received the C.B. on June 19th, 1911.

PROFESSOR W. A. FREUND died in Berlin on December 24th at the age of 84. As a gynaecologist he distinguished himself by his work on extirpation of the carcinomatous uterus, an operation which, according to German sources, he was the first to perform. Of recent years he had devoted himself to the pathology of pulmonary tuberculosis and emphysema. His contributions to the mechanics of respiration are undoubtedly of high value.

DR. CHARLES BLAREZ, professor of chemistry in the University of Bordeaux, who died on March 3rd, was born in 1852 and received a teaching appointment in 1874. He published more than two hundred memoirs on pure or applied chemistry, and was the author of a course of organic chemistry in three volumes, and of monographs on the urine, and on milk. His last publication was a treatise on wines and spirits embodying the results of forty years' work.

Medical News.

THE pay of army nurses in Germany has been raised from 33.30 to 60 marks a month.

DR. HENRY JACKSON (Putney Hill) has been adopted as prospective Liberal candidate for the Putney, Roehampton, and Southfields Division.

THE Board of the Prussian Medical Chamber has declared in favour of an immediate rise of 50 per cent. in the pay of doctors.

THE Royal Dental Hospital, Leicester Square, has received a donation of £500 from the trustees of Smith's (Kensington Estate) Charity.

DR. ALEXIS CARREL, whose hospital at Compiègne was recently destroyed by German bombs, has been made a Commander of the Legion of Honour in recognition of his services.

THE annual general meeting of the Asylum Workers' Association will be held at the Mansion House, London, on Wednesday next, May 29th, when the chair will be taken by the Lord Mayor at 3 p.m.

PROFESSOR THOMS, Director of the Pharmaceutical Institute in Berlin, reports that efforts to grow opium in Schleswig have proved successful, and that the dried opium contained as much as 22 per cent. of morphine.

A COURSE of lectures to nurses on venereal diseases will be given by Mr. Leonard Myer, F.R.C.S., at St. Paul's Hospital, 13A, Red Lion Square, W.C.1, beginning on Tuesday, June 4th, at 5 p.m. The lectures are open free to nurses and midwives.

A COURSE of demonstrations and discussions on venereal disease will be held in connexion with the work of the Venereal Diseases Department of the Royal Institute of Public Health on Wednesday afternoons, at 2.30, beginning on May 29th.

IN Berlin complaints of the excessive moisture of the bread have led the bread control authorities to caution the bakers. In future a sample of bread must be tested at least once a week in every bakery, and the moisture must not exceed 47 per cent. in the crumb.

ON the recommendation of a meeting of the heads of the French army centres of neurology and of representatives of the French Neurological Society, a committee of neuro-psychiatric control has been set up by the French War Office to exercise general control over neurological and psychiatric centres, and to deal also with individual cases in which there is a difference of opinion as to convalescence, discharge, or military punishment.

A COMMITTEE of American poets has given to the Italian army an ophthalmic motor ambulance designed by Professor Busi of Bologna and Major Balestra. The equipment all packs into a trolley of the dimensions required by the railway authorities. It provides a small operating room with wooden walls and roof covered with impermeable canvas, and a waterproof tent mounted on iron frames with a rainproof roof which forms a reception room, and also on occasion a radiological cabinet and for ophthalmoscopic examinations, when it is covered internally with black cloth.

IN the article on Military Orthopaedic Hospitals, by Dr. W. Colin Mackenzie, which originally appeared in the JOURNAL of May 26th, 1917, and has now been republished in the compilation *British Medicine in the War* (British Medical Association, 429, Strand, W.C.2; price 2s. 6d.) a list was given of orthopaedic hospitals and centres in the United Kingdom. In this the 2nd Northern General Hospital, Beckett Park, Leeds, was described as having 250 beds. We are informed that since April, 1917, there have been 1,800 beds at this hospital, and that in the present year the number has been increased to 2,000.

THERE were only eight deaths from typhoid fever in army camps in the United States from September, 1917, to March, 1918, when there was only one suspected case under observation. In the Spanish-American war the death-rate from typhoid was 8.79 per 1,000; if that rate prevailed to-day the American armies, on the basis of 1,500,000 men, would have lost 13,000 to 15,000 from this disease alone. There has been no death from dysentery, and there are no cases now under observation. The annual death-rates per 1,000 during the six months ending March 8th, 1918, were: from pneumonia 5.2, meningitis (all varieties) 1.04, measles 0.096, scarlet fever 0.042, diphtheria 0.940, tuberculosis 0.15.

THE lighting, heating, and power order of the Board of Trade was discussed at the meeting of the Illuminating Engineering Society on May 14th. It was recommended that in order to avoid waste, carbon filament lamps should be discarded as far as possible in favour of metal filament (tungsten) lamps, and flat flame gas burners in favour of modern (low pressure) incandescent burners, and that in

large rooms a single gas-filled (half-watt) lamp could advantageously replace a number of small filament lamps of less candle power. It was recommended also that wrappings of silk or coloured paper which absorb a great deal of light should be replaced by diffusing or prismatic glass devices or cardboard or enamelled shades with white interiors.

THE annual general meeting of the London and Counties Medical Protection Society, Limited, was held at the offices of the Society, 32, Craven Street, W.C., on May 15th. Colonel E. C. Bensley, Chairman of Council, who presided, said that the membership of the society had decreased to a very small extent during the year, but the financial position continued to grow stronger. Five hundred members had received advice and assistance, and about one hundred of these cases have been referred to the society's solicitors. Many of the cases were concerned with the administration of the Insurance Acts, with respect to which many vexatious matters were continually arising; others, a considerable number, had to do with matters arising out of military and naval service. The society had been very successful in its law suits, and several unqualified practitioners had been prosecuted and penalized. Dr. Owen Fowler, the acting treasurer, said that the investments of the society at the end of 1915 stood at £14,614, and at the end of last year, after a considerable sum had been written off in order to bring them down to current market values, they stood at £20,242. The President, Major-General Sir John Rose Bradford, was re-elected, as were all the other officers, and the four retiring members of the council.

A NEW charter has come into force this year at Cincinnati placing all the medical, scientific, and nursing work in the new city hospital under the direction of the university. The medical director of each department will be the professor in the corresponding department of the medical college, and the board constituted by these directors will nominate, through the president, all members of the staff of the hospital, including the superintendent, who will be the general executive and business manager. The superintendent will select all the other employees under the rules of the Civil Commission of the City. By this arrangement the hospital is removed from the sphere of politics and all the facilities of the hospital are made available for purposes of education and research. The new building of the medical college, which stands on a site of twelve acres immediately opposite the hospital, has recently been completed, and is, we learn from *Science*, now occupied. This gives Cincinnati a complete plant for medical teaching and research which has cost over £1,000,000. The medical college is a regular department of the university, which pays all its expenses. The city will continue to pay the general working expenses of the hospital, including heating, lighting, food, and engineering. The total cost to the city of the combined medical college and hospital plant will be, without including income on endowments, approximately £140,000 a year.

BIJL (*Nederl. Tijdschr. v. Geneesk*, December 15th, 1917), writing of the recent epidemic of cerebro-spinal meningitis in Holland, states that 54 cases were recognized in 1915, 226 in 1916, and 449 in the first six months of 1917. Expert assistance in making lumbar punctures was freely given to local doctors, and apparently the *Diplococcus intracellularis* was found in all the cases notified. A number of cases notified simply as (idiopathic) meningitis, in which no lumbar puncture was made, may have been instances of the epidemic form, for isolated cases of meningitis in remote villages were often found unexpectedly to be due to the diplococcus. This is one reason for thinking that a number of cases must occur annually in Holland and be mistaken for non-epidemic meningitis, or even for enteric fever, influenza, or other febrile diseases. The mortality of epidemic cerebro-spinal meningitis was 54 per cent. in 1916 and 43 per cent. in 1917, a fall due either to treatment or to the recognition of mild and atypical forms. The mortality from all forms of meningitis has steadily fallen in Holland from 3.96 per 10,000 in 1901 to 1.41 in 1916 in spite of the epidemic. A rise, of course, is now to be expected. The epidemic character of the illness is not pronounced. Bijl admits that 11 cases occurred in one small place and 30 in another, but in 1916 there were fifty-one districts in which only one case occurred, and in 1917 72 per cent. of the cases were solitary. Small epidemics of so-called sporadic idiopathic meningitis, of the form regularly occurring in Holland have often been noted. Thus, in small places, five, seven, and nine cases have occurred at the same time. This is a second reason for thinking that so-called epidemic cerebro-spinal meningitis is always present in Holland, unrecognized maybe, for the diagnosis can only be made bacteriologically.

Letters, Notes, and Answers.

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1. EDITOR of the BRITISH MEDICAL JOURNAL, *Attiology, Westrand, London*; telephone, 2631, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediscera, Westrand, London*; telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

The address of the Central Medical War Committee for England and Wales is 429, Strand, London, W.C.2; that of the Reference Committee of the Royal Colleges in London is the Examination Hall, 8, Queen Square, Bloomsbury, W.C.1; and that of the Scottish Medical Service Emergency Committee is Royal College of Physicians, Edinburgh.

QUERIES AND ANSWERS.

DR. LEONARD HILL, F.R.S., writes: It has been announced that I am to give a lecture at the Institute of Public Health, Russell Square, on July 3rd. Will you allow me to state that I have reconsidered this matter and this lecture will not be given?

EARLY THERAPEUTIC USE OF ANIMAL EXTRACTS.

DR. LOUIS MACPHERSON (Edinburgh).—The *locus classicus* as to organo-therapy in antiquity is the 28th Book of the encyclopaedic treatise on natural history by the Elder Pliny (23–79 A.D.). Of this work there is a fine English rendering (*The Histories of the World Commonly called The Naturall Historie of C. Plinius Secundus.* Translated into English by Philemon Holland, Doctor in Physicke. London, 1601). The ancients left little untried in the domain of animal extracts, and their enterprise was limited only by their ignorance of anatomy. Dioscorides, who flourished in the first century of the Christian era, in his great work (*De materia medica*, Libri V, Recensuit etc. Curt Sprengel: Medicorum Graecorum Opera, Leipzig, 1829–30) gives a large place to animal extracts. But it was not till the middle ages that organo-therapy received the freedom of the medical city. One of the chief sources on the subject is Mesuë, an Arabic writer as to whose identity there is some mystery. It would seem that two different authors had become fused into one. Mesuë the elder (A.D. 777–857) was physician in ordinary to the famous Caliph Haroun-al-Raschid of the *Arabian Nights*, and afterwards to Al-Mamoum. His aphorisms were gathered into a volume which was translated into Latin under the title *Selecta Artis Medicae*. Down to the fourteenth century he was constantly quoted by medical writers under the name of Janus Damascenus (John of Damascus). Mesuë the younger (circa 1015 A.D.) is said to have been a pupil of Avicenna, but there seems to be some reason to believe that a Latin compiler of the tenth or eleventh century assumed the name. His writings on materia medica formed the basis of the western pharmacopoeias, and were consulted up to the beginning of the eighteenth century. Organo-therapy was practised, on the lines laid down by Mesuë, by Rhazes and Albucasis in the tenth and Avicenna in the eleventh century. In the twelfth century the teachers of Salerno followed the Arabians in the use of animal extracts. In the thirteenth century Albertus Magnus, in his *Liber Secretorum de virtutibus herbarum, lapidum et mineralium* (1280), and Guy de Chauliac, in his *Grande Chirurgie*, written in 1363, speak of the use of animal extracts and secretions. Among other writers who recommend them may be mentioned Fernel, in his work on therapeutics (1558); Jerome Cardan, in *Ars Curandi Parva* (1566); Liébault, in *Quatre Livres des Secrets de Médecine* (1573); Pietro Andrea Mattioli of Siena, who wrote a commentary on Dioscorides (1572); Jean de Renou, in his *Dispensatorium* (1608); Nicholas Lémery in his *Pharmacopée* (1689), and *Dictionnaire des Drogues* (1698); Pomet in his *Histoire générale des Drogues* (1694); and Lieutaud in his *Précis de la matière médicale* (1748). A more accessible source is Alfred Franklin's *La Vie privée d'autrefois: les médicaments* (Librairie Plon, rue Garancière, 10, Paris, 1901). Nicolas Culpeper (1616–54), in his *Physicall Directory* (1649), an unauthorized translation of the pharmacopoeia issued by the College of Physicians, ridicules not unhappily the animal remedies included in that work. The pharmacopoeias of the sixteenth and seventeenth centuries recall the hell broth of the witches' cauldron in *Macbeth*. Traces of these horrors are to be found in dispensatories published in this and other countries down to the nineteenth century. Gordon Cumming, in his *Wanderings in China*, gives numerous examples of the use of disgusting remedies of animal origin in the Celestial empire, and an important chapter is devoted to medicine in Captain Bourke's *Skatological Rites of all Nations* (see BRITISH MEDICAL JOURNAL, June 11th, 1892.

p. 1263). In a series of articles on organic medication before Brown-Séquard, published in the *Archives Cliniques de Bordeaux* (February, March, April, 1898), Dr. Félix Brunet, a medical officer of the French navy, gives a historical review of the subject with a copious bibliography.

LETTERS NOTES, ETC.

PHYSICAL DETERIORATION OF BOYS UNDER WAR CONDITIONS.

MR. ROBERT R. HYDE (Director of the Boys' Welfare Association, Sanctuary House, Tothill Street, Westminster, S.W.1.) writes: Much attention has been devoted to the above question during the last two years, and in spite of the abnormal conditions under which industries are being carried on, many attempts have been made to grapple with it. The evils can only be counteracted by personal influence and leadership (the suggestion of Dr. Howard Distin in your issue of May 11th, as to the limitation of wages, involves many serious issues, and is impracticable). In order to supply such forces where they can be used to the best advantage—that is, in workshops and factories—a scheme of boys' welfare supervision has been adopted by some hundreds of leading employers throughout the country. Results, so far, have been excellent.

SOLDIERS' TRACT ON VENEREAL DISEASES.

MR. WILLIAM JONES (librarian, the Liverpool Medical Institution) writes that during the past two years the Institution has distributed 250,000 copies of a pamphlet written in plain non-technical language for young soldiers, warning them of the dangers and disabilities incurred by contracting these avoidable diseases. The tract has proved to be of great acceptance after lectures or talks to the men on these subjects. Inquiries are invited from C.O.'s, members of the R.A.M.C., chaplains, and social workers who would care to have a number of copies sent for distribution. Letters addressed to the librarian, Liverpool Medical Institution, will receive prompt attention.

THE HUMAN AND THE EQUINE FOOT.

MR. T. S. ELLIS (Gloucester) writes: Under the heading of "Feminine Equinism" is recorded in the JOURNAL of March 30th a discussion at the French Academy of Medicine on the effect of the high-heeled shoe, and on a deformity called "equinism, the horse foot, or hoof foot." I do not see how a resemblance to a hoof can be so caused, but I ask permission to tell once more how a recognition of the close analogy in the formation of my own foot and that of the horse was to me of inestimable value.

More than half a century ago my own foot was crushed between the body of a horse and the stones of a street crossing. The astragalus was forced inwards (subastragaloid dislocation) and the middle cuneiform upwards so as to project on the surface of the foot. Both deformities are still manifest. After some months I was able to walk, wearing a costly and very uncomfortable apparatus; the prospect of having to go through life under such conditions weighed heavily upon me. I happened to see a horse rear to an unusual height, and I marvelled at the strain there must be on the ligaments which bound together the bones which form the fetlocks. The backward and downward thrust must be enormous, such as no ligaments could stand. On reflection I thought that the tendon of the great flexor muscle, coming down from the haunch past the hock (the anatomical heel) and subtending the curve of the fetlock, must have a bow-string or tie-rod effect upon it. This would relieve the strain on the ligaments. I thought, too, if this be so, is not the tendon of the flexor longus pollicis in my own foot the bow-string or tie-rod of my plantar arch? And, further, is it not possible that a vigorous and prolonged action of this muscle would restore my flattened foot? Perseverance, pain being disregarded, soon brought some reward, but the story of the restored arch would be too long to tell here. Enough to say that I never again wore any kind of apparatus, and for many years no one who did not know would suppose that I had ever been lame. In my book, *The Human Foot*, and elsewhere I have tried to convince others of the practical importance as well as scientific interest of foot physiology. How little it is recognized is shown by the discussion at the French Academy, when it was thought worth while to pass "a resolution declaring that the fashion of very high heels was injurious and absurd." Moreover, the British Government supplies the public with boots having heels 2½ in. high with toes pointed in the middle line, in disregard of anatomy, of the great human characteristic of asymmetry of form and of difference in function between the great toe and that of the smaller toes.

THE OLDEST ENGLISH HOSPITAL.

DR. S. D. CLIPPINGDALE points out that Miss Mary Clay, in her book on *The Mediaeval Hospitals of England*, defines these early institutions as "houses for wayfarers, sick, aged and infirm, insane and lepers (founded before 1547)." The earliest dates of hospitals in England mentioned by her are 1087, St. Nicholas, Nantwich; 1089, St. John the Baptist and St. Nicholas, both in Canterbury. In 1100 followed St. Leonard Bentley, Derbyshire, and St. Cross, Bath. The date of the foundation of St. Bartholomew's, Rochester, is given as 1108. Dr. Clippingdale would derive the word "hospital" from hospitium, which meant a place to receive guests. Murray (*N.E.D.*) infers that it came into English from the French, which got it from the mediaeval Latin "hospitale," the neuter singular of an adjective meaning really hospitable. Murray recognizes that the current use of the word "hospital" is confined to an institution for the care of the sick and wounded. Dr. Clippingdale refers incidentally to the fact that the hospital established in Jerusalem by the knights of St. John in 1112, which was capable of receiving 2,000 persons, had its infirmary. So did many religious institutions. Murray states that "infirmary" was the common English word for a public hospital in the eighteenth century, and the use has survived very generally, we believe, in Scotland as well as in many large English towns.

THE FIRST INCUBATED BABY.

IT is said that the first instance of successful rearing in an incubator was a premature infant who grew up to be a distinguished member of the medical profession. The case is related by Adrien Baillet in *Le jugement des Savants sur les principaux ouvrages des auteurs* (Paris, MDCCXXII). Fortunio Liceti, a man of encyclopaedic knowledge, was born on the coast of Genoa on October 3rd, 1577, two hours after midnight, during a voyage which his parents made from Recio, their native place, to the town of Rapallo, where his father intended to settle as a practitioner of medicine. The fatigue of the journey, combined with the fury of a storm which they encountered in passing near Cape Portofino, brought on labour pains in his wife, which he considered to be false in spite of all the mother could say to persuade him that she was not far off the seventh month. The babe, which was not larger, it was said, than the palm of the hand, was brought alive to Rapallo, where it was shown to Jerome Bardi and other physicians. It was found that nothing essential to life was lacking, and the father undertook to complete the work of Nature by the same artifice that is used to make chickens hatch in Egypt. He instructed a nurse, and had his son placed in a properly fitted oven kept at a uniform temperature exactly measured with the thermometer. The child lived nearly eighty years and composed eighty different works. In addition to this account which Baillet found in the work of Michael Giustiniani (*Degli Scrittori Liguri*), and which is quoted by Sterne in *Tristram Shandy*, where the length of the fetus is given as 5½ in., there is another which represents Liceti as simply having been reared in a box lined with cotton. It is not possible to determine which of the two accounts is the more authentic, but the oven heated in an uncertain way, in which the atmosphere must have been dangerously dry, and the absence of data as to the manner in which feeding was carried out, render the first story somewhat suspect to those who know the minute care with which a child in an incubator has to be surrounded. Rearing in cotton under similar conditions would not be more easy. Liceti was successively professor of philosophy at Pisa and Padua, physician at Bologna, and professor of medicine at Padua. It is true the eighty books with which he is credited by his biographers rather suggest that, like the great Lipsius, he composed a work on the day he was born, but there are certainly more than fifty which bear his name. In addition he corresponded with the most intellectual men of his day, and his letters fill many volumes. He died in 1657.

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